DOCUMENTS EXPEDITING PROJECT

85th Congress
2d Session

JOINT COMMITTEE PRINT

PROPOSED EURATOM AGREEMENTS

(with associated documents and materials)

JOINT COMMITTEE ON ATOMIC ENERGY

CONGRESS OF THE UNITED STATES

JULY 1958

Printed for the use of the Joint Committee on Atomic Energy

UNITED STATES
GOVERNMENT PRINTING OFFICE
28094 WASHINGTON : 1958

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FOREWORD

This publication, containing the proposed Euratom agreements and associated documents and materials, has been prepared for use in connection with consideration of these agreements by the Joint Committee and the Congress. The committee print includes the following documents and materials (the listing does not follow the order of the documents in the print):

1. The proposed international arrangement under section 124 of the Atomic Energy Act of 1954.
2. The proposed agreement for cooperation under section 123 of the act to implement the arrangement.
3. A draft bill covering the legislation and authorization necessary for United States participation. (This proposed legislation has been introduced, by request, as H. R. 13119 and S. 4047. No suggested legislation has been submitted by the executive branch providing for congressional approval of the international arrangement under section 124 of the act.
4. A covering letter to the chairman of the Joint Committee from Chairman Strauss of the Atomic Energy Commission, dated June 23, 1958.
5. The President's letter of transmittal to Congress accompanying submission of the proposed agreements.
6. A memorandum of understanding between the United States and the Euratom nations.
7. A summary of the authorization and obligational authority required and estimated expenditures under the program on the United States side for fiscal year 1959.
8. Letters exchanged by the negotiators, together with working papers.
9. Letters from the Joint Committee to the Atomic Energy Commission and State Department listing certain questions of interest to the Committee in connection with the proposed agreements; and
10. Copy of a letter from the Joint Committee to reactor experts and other industry representatives requesting their comments on the proposed agreements.

The Euratom agreements, together with the attached materials and suggested legislation, involve matters of great importance to United States policy, particularly with regard to United States cooperation with our European allies and the development of United States atomic power plans abroad. A number of complex issues affecting the national interest are raised by these proposed agreements which must, of necessity, receive the most careful and thorough consideration by the Congress.

In view of the press of business in the final weeks of the present session of Congress, it is regretted that the proposed agreements were not submitted to Congress until late last month for consideration and action. However, the Joint Committee appreciates the importance of the proposed agreements with regard to development of the United States atomic power program abroad and the advancement of European economic integration. For these reasons, the committee intends to give prompt consideration to the proposed agreements with a view to securing congressional action on the proposals at the earliest practicable moment.

CARL T. DURHAM,
Chairman, Joint Committee on Atomic Energy.

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JOINT COMMITTEE COMMUNICATIONS WITH THE ATOMIC ENERGY COMMISSION, DEPARTMENT OF STATE, AND REACTOR EXPERTS REGARDING PROPOSED AGREEMENTS

CONGRESS OF THE UNITED STATES,
JOINT COMMITTEE ON ATOMIC ENERGY,
July 9, 1958.

Dr. WILLARD F. LIBBY,
Acting Chairman, United States Atomic Energy Commission,
Washington, D. C.

DEAR DR. LIBBY: This will confirm Mr. Ramey's notification to Admiral Foster that the Joint Committee will begin public hearings on the Euratom program and proposed implementing legislation (H. R. 13119 and S. 4047) on Wednesday, July 16, at 10 a. m. and 2 p. m. Representatives of the State Department are expected to lead off the testimony at 10 a. m. A copy of our letter to the State Department is attached.

It is expected that Commission representatives would present testimony on the Euratom program at the 2 p. m. session on Wednesday.

Attached for your information is a copy of a list of questions which the Joint Committee has addressed to a group of reactor experts and industry representatives on the Euratom program. It would be appreciated if the Commission would make appropriate comments on these questions during its presentation.

Among other matters in which the Joint Committee will be particularly interested, and on which testimony from the Commission would appear pertinent are the following:

1. A description of how the technical program and financial and administrative arrangements were developed, including the extent to which the United States atomic equipment industry as a group or individually was consulted in the formulation of the program.

2. The relationship between the Euratom program and the United States domestic atomic energy program. What guarantees do we have that funds provided under the program will be used for contracts with United States atomic equipment manufacturers?

3. The question of whether the program is or can be planned and phased so as to provide not only for construction of "proven" reactor types but also for reactor types which the Commission believes can be proven out in a large scale program in the time period allowed.

4. The question of whether the particular subsidy arrangements are as desirable as possible alternatives such as capital subsidy, waiver of use charges, and the like.

5. The methods of protecting the United States financial interests in connection with the sale of U–235 on the installment plan, i. e., the problem of retention of title to the material, downpayments, etc.

6. What rights does the United States retain as to control of the price of the U–235 once it has been sold to Euratom? i. e., can Euratom place an additional charge to cover overhead? profit? Can Euratom or the industrial Euratom countries raise tariffs on atomic equipment sold by American manufacturers under the program?

7. The status of third-party liability and indemnity coverage of the Euratom program, and the effect of any delay of such coverage on meeting the 1963 deadline date.

8. The question of the methods of inspection provided, and the relationship to the International Atomic Energy Agency inspection standards, procedures, and personnel.

9. The proposed methods of information exchange, and patent and licensing arrangements, including the extent to which American manufacturers are protected as to utilization of United States patents and "know-how" by foreign firms in manufacturing reactors of the same type.

In addition to the above comments and information requested it would be appreciated if you would provide the committee with information on how the Commission is organized to administer its overall foreign atomic power program and particularly how it will be organized to administer the Commission's responsibilities in the Euratom program. In this connection we would appreciate information on the Commission's organization Administration and the Executive Office of the President in connection with the administration of the Euratom and other foreign atomic energy programs.

In connection with the committee's interest in the foreign atomic power programs and particularly Euratom, it would appear desirable for the Commission to bring up to date its statement of last year on foreign atomic power programs for inclusion as an appendix to the Euratom hearings.

Sincerely yours,

CARL T. DURHAM, *Chairman.*

CONGRESS OF THE UNITED STATES,
JOINT COMMITTEE ON ATOMIC ENERGY,
July 9, 1958.

The Honorable JOHN FOSTER DULLES,
The Secretary of State.

DEAR MR. SECRETARY: This will confirm Mr. Ramey's phone notification to Mr. Farley that the Joint Committee will begin public hearings on the Euratom arrangement and agreements on Wednesday, July 16, at 10 a. m. The hearing room will be announced at a later date.

It is understood representatives of the State Department will lead off the hearings, presumably with a statement outlining how the

Euratom proposal fits into the Government's overall foreign policy, particularly in relation to the European area.

Attached for your information is a copy of a list of questions we have sent to a group of reactor experts and atomic energy industry representatives concerning the Euratom program. Representatives of the AEC also have been requested to comment on these questions. Please feel free to comment on any of the questions which you believe are pertinent to the State Department's interests.

In addition to the State Department's comments along the above lines it would appear appropriate for the State Department specifically to discuss the foreign policy implications of the inspection measures proposed for the Euratom program and its relationships to the International Atomic Energy Agency inspection standards and procedures.

We also would like to receive information on how the State Department is organized to administer its responsibilities in the foreign atomic energy field, particularly in relation to Euratom. In that connection we would appreciate information of your relationship with the Atomic Energy Commission, the International Cooperation Administration, and the Executive Office of the President.

A copy of our letter to the Atomic Energy Commission is attached.

Sincerely yours,

CARL T. DURHAM, *Chairman.*

JOINT COMMITTEE LETTER TO REACTOR EXPERTS AND INDUSTRIAL REPRESENTATIVES

CONGRESS OF THE UNITED STATES,
JOINT COMMITTEE ON ATOMIC ENERGY,
June 30, 1958.

DEAR SIR: On June 23, 1958, the President submitted to the Congress a proposed agreement with Euratom for cooperation in nuclear-power development under sections 123 and 124 of the Atomic Energy Act of 1954. The proposed arrangement, together with supporting documents, has been referred to the Joint Committee for consideration.

It would be greatly appreciated by the committee if you would review the enclosed material relating to the proposed arrangement with Euratom and would send the committee your comments. These comments would be most helpful to the committee in connection with its consideration of this matter and will provide useful background information for committee hearings on the proposal.

Specifically, the committee would appreciate your views on the following:

1. Do you believe that the general approach and major provisions of the proposed arrangement are appropriate for our atomic power program abroad?

2. Are the specific types of United States assistance provided for in the proposed arrangement desirable? If not, what other types of assistance would you suggest?

3. Do the types of assistance provided for pose any serious problems, from a technical or industrial standpoint, with regard to the sale of United States reactors, components and fuel elements abroad?

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4. Do you believe the types of reactors contemplated in the agreement are desirable for export abroad? Do you believe any other types should be included? If so, what are they?

5. What are your views as to the phasing or scheduling of the projects, particularly with regard to plans for selection of reactor types and the limiting date of 1963 for completion of construction?

6. Do you consider the cost estimate of $350 per kilowatt (exclusive of fuel) to be realistic?

7. Do you favor a system wherein the United States Government guarantees fuel element performance and in effect underwrites the fuel costs in this program?

8. Is the published information on AEC fuel reprocessing costs adequate for normal business negotiations in connection with the Euratom program?

9. What are the implications of this program for our own domestic program? Are there adequate provisions for making available to American industry the technical information developed in the joint research and development effort?

Any other comments you may have on the proposed arrangement would be welcome.

The committee is tentatively planning to hold hearings on the proposed arrangement with Euratom beginning about the second week in July. I recognize that the volume and complexity of the enclosed material will require some time for study and evaluation but it would be appreciated if you could send us your views as early as possible and not later than Wednesday, July 9, so that they can be of maximum assistance in connection with the committee hearings. You appreciate, of course, that your comments may be incorporated into the hearing record.

Thank you very much for your cooperation.

Sincerely yours,

CARL T. DURHAM, *Chairman.*

PROPOSED EURATOM AGREEMENTS

UNITED STATES ATOMIC ENERGY COMMISSION,
Washington, D. C., June 23, 1958.

Hon. CARL T. DURHAM,
Chairman, Joint Committee on Atomic Energy,
Congress of the United States,
Washington, D. C.

DEAR MR. DURHAM: The President has transmitted to the Speaker of the House of Representatives and the President of the Senate a proposed international agreement between the United States of America and the European Atomic Energy Community for the approval by Congress pursuant to provisions of sections 11 (1) and 124 of the Atomic Energy Act of 1954, as amended. The approval by the Congress of the proposed international agreement will be one of the first steps necessary to initiate a proposed cooperative nuclear-power program between the United States and the Community which will be designed to foster the construction in Europe by 1963 of approximately 6 major nuclear-power reactors having a total installed capacity of approximately 1 million kilowatts of electricity. I am enclosing a copy of the President's message of transmittal (appendix A), as well as the international agreement (appendix B).

On May 29, 1958, the Commission of the European Atomic Energy Community and on June 12, 1958, the Secretary of State and I signed a memorandum of understanding, which was prepared as the first step in reaching agreement with respect to the proposed program. Enclosed are three certified copies of this document (appendix C). There also has been negotiated, pursuant to section 123 of the act, a proposed agreement for cooperation embodying the proposed program which has been initialed by the parties. I am enclosing three certified copies of this document for the information of the Joint Committee (appendix D). Following the approval of the international agreement by Congress, the agreement for cooperation will be submitted to the President in conformance with the provisions of section 123 of the act and thereafter submitted to the Joint Committee in the usual manner.

In his message to Congress the President noted that, in addition to the international agreement, the necessary legislative, authorization, and appropriation requests required to carry out the program would be submitted shortly. There is transmitted herewith, as appendix E, a draft bill providing such additional authority as the Commission believes necessary to carry out the proposed program.

I believe it would be helpful if I summarized the proposed program of cooperation as well as the legislative action being requested so that you might see how the two are related.

The aim of the joint program is to bring into operation in the Community, by 1963, about 1 million electric kilowatts of installed nuclear capacity, in reactors of proven types developed in the United States, and to initiate immediately a joint research and development program centered on these types of reactors. The program would be conducted so as to obtain maximum support of the industries of the Community and of the United States in achieving these objectives.

The total capital cost of the reactors to be included in the program, exclusive of fuel, has been estimated as not to exceed $350 million. Approximately $215 million would be provided for by the participating utilities and other European sources of capital, such financing to be arranged with the appropriate assistance of Euratom. In addition, up to $135 million would be provided by the Export-Import Bank to Euratom in the form of a long-term line of credit at 4½ percent interest to cover a portion of the total capital costs. The funds provided by the Export-Import Bank would be re-lent by Euratom. Preliminary contracts by Euratom with European utilities have indicated that the utilities will have no difficulty in arranging financing equivalent to that needed for 1 million kilowatts of conventional power—about $150 million. This, plus the United States loan of $135 million, leaves approximately $65 million to be found of the overall capital cost of the program. The President of the Euratom Commission has already approached the European Investment Bank and has asked that the bank take the lead in arranging for financing this remaining $65 million.

The nuclear powerplants under the program will be built, owned, and operated by utilities in the member states. All risks due to uncertainties in construction, maintenance, and operating costs and load factors will be borne directly by these utilities. In the course of the negotiation it was determined that the economic risks associated with the reactor-fuel cycle must be minimized if participation by the European utility industry is to be reasonably assured. To this end, the United States, for a 10-year period of operation, will guarantee ceiling costs for the fabrication of the fuel elements required, as well as a fixed life for these elements. The provision of this form of assistance is considered to be vital to the success of the program. Attachment A to the memorandum of understanding, enclosed, describes this proposed fuel-cycle arrangement in detail.

Section 4 of the proposed legislation, in accordance with section 261 (a) (2) of the Atomic Energy Act, would provide the funds and other authority necessary to carry out this aspect of the joint program. Contracts entered into under this section would not extend for a period longer than that necessary to cover fuel loaded into a reactor constructed under the joint program during 10 years of its operation or prior to December 31, 1973, whichever is earlier.

A joint research and development program also would be established. This program, which would be for a 10-year period, would be centered on the improvement in the performance of the reactors involved in the program, and the lowering of fuel-cycle costs. During the first 5 years, the financial contribution of the Community and the United States would amount to about $50 million each. The sum required for the second 5-year period would be determined at a later date. Section 3 of the proposed legislation would provide the Commission

with the authority it requires to participate in this phase of the program.

Under the arrangements proposed, the United States would sell to the Community a net quantity of 30,000 kilograms of contained U–235 in uranium to cover the fueling and other requirements of the program for such material over a 20-year operating period. The initial operating inventory, which amounts to approximately 9,000 kilograms of contained U–235, would be sold to the Community on a deferred payment basis. The balance of about 20,000 kilograms, which represents estimated burnup and process losses over the 20-year operating period, and 1,000 kilograms to provide for research and test reactors associated with the program, would be paid for on a current basis.

A relatively small amount of plutonium would be provided to the Community for research purposes. The quantities of enriched uranium to be made available would come from quantities of U–235 set aside by the President under section 41b of the Atomic Energy Act for distribution to foreign countries. Section 5 of the proposed bill contains the congressional authorization which is required, pursuant to section 54 of the Atomic Energy Act, before quantities of special nuclear material may be transferred to "a group of nations." The transfer, of course, also would be subject to the provisions of the agreement for cooperation to be entered into between the United States and the European Atomic Energy Community.

Ownership and responsibility for the approximate quantity of 21,000 kilograms of special nuclear material for which Euratom pays in cash will be transferred to the Community at a designated port or ports of embarkation. For the initial operating inventory of about 9,000 kilograms made available under a deferred payment plan the Commission will retain such rights in the material as are appropriate to secure the payment of the debt due under the sales agreement. Such rights will be encumbrances on the material and will be set forth in the sales agreement. They will include provisions relating to the return of special nuclear material in sufficient quantities to satisfy the Community's debt to the Commission in the event Euratom does not meet the payment schedule set forth in the sales agreement and provisions that the Community will not establish any obligation with respect to such material which has priority over the Commission's rights.

It is contemplated that the United States also would be prepared to perform, on terms and conditions to be agreed, chemical processing services with respect to any source or special nuclear material received by Euratom from the United States under this program. Section 6 of the proposed legislation would permit the Atomic Energy Commission to enter into long-term contracts with the Community to provide such services for such periods of time as the Commission may deem necessary or desirable at established domestic prices in effect in the United States at the time of delivery of such material.

The arrangements that have been formulated provide that the International Atomic Energy Agency would have the right of first option to purchase special nuclear materials produced in reactors fueled with materials obtained from the United States under the joint program, which are in excess of the Community's need for such

material for peaceful uses. In the event this option was not exercised by the Agency, the United States would be prepared to purchase such material. Such purchases by the IAEA or the United States would be at the established fuel value price in effect in the United States at the time of purchase. In keeping with the President's announcement of November 18, 1956, the material purchased by the United States would be used solely for peaceful purposes. Section 7 (a) of the proposed legislation authorizes the Atomic Energy Commission to acquire from the Community up to 4,100 kilograms of plutonium for peaceful purposes.

In conjunction with this phase of the program it has been concluded that it will be necessary to provide the Atomic Energy Commission with authority to enter into contracts with Euratom which would provide the utilities participating in the program with a long-term assurance regarding the acquisition by the United States of the plutonium involved. Section 7 (b) of the proposed legislation, accordingly, provides that the Commission may enter into contracts for the acquisition of such material provided that no such contract shall be for a period greater than 10 years of operation of the reactors involved or extend beyond December 31, 1973, whichever is earlier. This section also provides that this material must be purchased at the Commission's established fuel-value price at the time of delivery for such material. Section 7 (c) further provides that the Commission may enter into contracts for the acquisition of enriched uranium from the Community provided that any such contract does not extend beyond the terminal date of the agreement for cooperation to be entered into between the United States and the Community, the quantities so acquired do not exceed those distributed to the Community by the Commission, less burnup, and the price paid for the material does not exceed the Commission's established charges for such material in effect at the time of delivery to the Commission.

One of the major purposes of the proposed program would be to provide industry in the United States and Europe with important engineering experience and data on capital and operating costs. As a consequence, the proposed arrangement contemplates that technological and economic data developed under the joint program will be made available to the industries within the Community and the United States under provisions designed to assure the widespread dissemination of information developed in the course of the program.

In formulating the proposed program the representatives of the Community and the United States recognized that it would be in their interest to establish a mutually acceptable arrangement which would assure that the materials involved would be used solely for peaceful purposes. Under the arrangement that has been developed, the Community has made all of the guaranties required by the Atomic Energy Act that none of the materials supplied will be used for military purposes. The Community also has assumed the responsibility for the establishment of a safeguard system in accordance with a series of principles set forth in the memorandum of understanding. These principles are compatible with and are based on article XII of the Statute of the International Atomic Energy Agency, chapter VII of the treaty establishing the European Atomic Energy

Community, and those adopted by the United States in its comprehensive agreements for cooperation. The system to be established will be designed to assure that the materials received from the United States, as well as special nuclear material produced therefrom, only will be used for peaceful purposes. The United States will assist the Community in establishing the system and there will be frequent consultation and visits to assure that the system is operating effectively under the agreed upon principles. Both parties have agreed that the terms of the agreement include permission for verification, by mutually approved scientific methods, of the effectiveness of the safeguard and control systems applied to nuclear materials received from the other party or derived therefrom in connection with the joint program. The continuation of the cooperative program will be contingent upon the Community's establishing and maintaining a mutually satisfactory safeguards system. The Community also is prepared to consult with the International Atomic Energy Agency to assure that the system will be reasonably compatible with that of the Agency. In addition, in the event of the establishment of an international safeguards and control system by the International Atomic Energy Agency, the United States and Euratom will consult regarding assumption by that agency of the safeguards and control over fissionable material utilized and produced in implementation of the joint program. The Atomic Energy Commission and the Department of State believe that the special safeguard arrangement proposed with Euratom will provide the United States with the assurance that the materials involved will be used only for peaceful purposes.

Lastly, in the light of the tight time schedule that faces us in completing all of the necessary legislative steps during this session of Congress to permit the initiation of the program, section 8 of the proposed legislation provides that the Joint Committee may waive the requirement contained in section 123c of the Atomic Energy Act that the proposed agreement for cooperation must lie before the Joint Committee for 30 days while the Congress is in session.

Appendix F to this letter contains a summary of the funding and financial requirements for the proposed program.

Appendix G contains a series of letters that were exchanged by the principal negotiators to clarify various facets of the program.

Appendix H contains a series of working papers that were developed in the course of preparing the memorandum of understanding. These documents should be useful to the committee in reviewing the background and basic assumptions underlying the program.

The Bureau of the Budget has reviewed the proposed legislation and has advised that it is in accord with the program of the President.

In conclusion I should like to mention that I earnestly hope that the Joint Committee will give the proposed program immediate and affirmative consideration. If the objectives of the program are to be realized on schedule it is important that all of the legislative steps necessary to initiate the program be completed during this session of Congress. The Secretary of State has advised me of his enthusiastic support of the program in the light of its considerable importance to our foreign-policy objectives in western Europe. I also believe that the proposed program will result in important benefits to our domestic

and foreign program in the field of peaceful uses of atomic energy. We will be happy to discuss these matters with the Joint Committee at your earliest convenience.

Sincerely,

LEWIS L. STRAUSS, *Chairman.*

(Appendixes: A, President's message; B, International agreement; C, Memorandum of understanding; D, Agreement for cooperation; E, Draft bill; F, funding and financial requirements; G, letters exchanged by negotiators; H, working papers.)

APPENDIXES

Appendix A

Presidential Message to Congress

This message covers transmittal for the approval of Congress, pursuant to the provisions of sections 11 (L) and 124 of the Atomic Energy Act of 1954, as amended, of an international agreement between the Government of the United States and the European Atomic Energy Community (Euratom). Congressional approval of the agreement is the first legislative step, with others to follow, necessary to carry out the United States side of the joint United States and Euratom program.

To the Congress of the United States:

I am transmitting today for approval by the Congress an international agreement between the Government of the United States and the European Atomic Energy Community which will be a first step toward mutually beneficial cooperation in the peaceful applications of atomic energy between this new European Community and the United States. The specific program which I am asking the Congress to consider and approve on an urgent basis is a joint undertaking by the United States and Euratom to foster the construction in Europe by 1963 of approximately 6 major nuclear power reactors which would produce about 1 million kilowatts of electricity.

This international agreement is being submitted pursuant to the provisions of sections 11 (L) and 124 of the Atomic Energy Act of 1954, as amended. The cooperation to be undertaken after approval of the international agreement will be pursuant to the terms and conditions of an agreement for cooperation entered into in accordance with section 123 of that act.

The elements which combine to make such a joint program possible are the same that led to the first great breakthrough in the development of atomic energy 15 years ago: the intimate association of European and American scientists and close association between European and American engineers and industries. While the joint nuclear-power program draws heavily on the history of atomic energy development there are important new elements which reflect the changing world scene.

The first is the changing face of Europe symbolized by the European Atomic Energy Community, which now takes its place beside the Coal and Steel Community and the European Economic Community (Common Market) in a further major step toward a united Europe. The inspiration of European statesmen, which has now come to fruition in Euratom, is the simple but profoundly important idea that through concentration of the scientific and industrial potentialities of the six countries it will be possible to develop a single major atomic energy complex, larger than the sum of the parts, and designed to exploit the peaceful potential of atomic energy. One motivation which has therefore led to the creation of this new Community is the growing sense of urgency on the part of Europeans that their destiny requires unity and that the road toward this unity is to be found in the development of major common programs such as Euratom makes possible. Another important motivation is the present and growing requirement of Europe for a new source of energy in the face of rapidly increasing requirements and the limited possibilities of increasing the indigenous supply of conventional fuels. The Europeans see atomic energy not merely as an alternative source of energy but as something which they must develop quickly if they are to continue their economic growth and exercise their rightful influence in world affairs. The

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success of this undertaking, therefore, is of vital importance to the United States, for the 160 million people on the Continent of Europe are crucial to North Atlantic strength.

It is therefore gratifying that the reactor research, development, testing, and construction program in the United States has progressed to the point that United States reactors of proven types are available and will be selected for commercial exploitation in the joint program of large-scale nuclear reactors.

The abundance of conventional fuel in the United States and hence our lower cost of electricity as contrasted with higher energy costs in Europe means that it is possible for nuclear power reactors to produce economic electrical energy in Europe before it will be possible to do so in most parts of the United States.

The basic arrangements which have been worked out with Euratom are designed to take advantage of many favorable factors and circumstances. They promise to result in a program that will initially be of great benefit to Euratom and the United States, and thereafter to nations everywhere that choose to profit from Euratom's experience. American knowledge and industrial capacity will be joined with the scientific and industrial talents of Europe in an accelerated nuclear-power program to meet Europe's presently urgent need for a new source of energy.

The plants to be built will be paid for and operated by the existing public and private utilities in the six countries; components will be manufactured by American and European industry. Through this association the basis will be laid for future mutually beneficial commercial collaboration in the atomic energy business. The major portion of the fund for the construction of the plants will come from European sources of capital. The United States, through the Export-Import Bank, is prepared to supplement these funds by making available to the new Community a long-term line of credit.

A central purpose of the proposed joint program is for Euratom and the United States Government to create an institutional and economic environment which will encourage the European utilities to embark quickly upon a large-scale nuclear-power program. As this program goes forward, it will make possible significant progress in the development of atomic power elsewhere in the world.

The expectation that nuclear power will be economic rests on the inherent promise of achieving substantially lowered fuel costs which will more than compensate for the higher capital costs of nuclear plants. The principal immediate problem is to limit during this developmental phase the economic uncertainties connected with the burning of nuclear fuel in these reactors. To assist in meeting this problem the United States will provide certain special and limited guaranties and incentives to permit American fuel fabricators and the European utilities and industries to enter into firm contractual arrangements with greater certainty as to the actual costs of nuclear energy from the reactors than is now possible.

Of major importance, the new European Community and the United States will establish a jointly financed research and development program, the purpose of which will be to improve the performance of these reactors and thus to further the economic feasibility of nuclear power. Information developed under the joint program will be made available to American and European industry for the general advancement of power-reactor technology.

In addition to the international agreement submitted herewith, the necessary requests for congressional action required to carry out the program will be submitted shortly.

I believe that the initiation of this program of cooperation with Euratom represents a major step in the application of nuclear technology for the benefit of mankind.

The United States and Euratom have reaffirmed their dedication to the objectives of the International Atomic Energy Agency and intend that the results of this program will benefit the Agency and the nations participating in it Consideration is now being given to ways in which the United States can work with the Agency in carrying forward its functions. A proposed agreement for cooperation with the International Atomic Energy Agency is now being negotiated and is under review by the Agency. This agreement provides principally for the transfer of the special nuclear material already offered to the Agency by the United States, for certain services such as chemical processing, and for the broad exchange of unclassified information in furtherance of the Agency's program.

In recognition of the importance of the joint United States and Euratom program, I must stress its urgency. It was only the 1st of January of this year that the new Community came into being, determined to fulfill its obligation to

create the conditions which will permit the earliest development of nuclear power on a major scale. The Community is determined, as are we, that the joint program should be initiated this year. I am sure that the Congress, having in mind the political and economic advantages which will accrue to us and our European friends from such a joint endeavor, will wish to consider quickly and favorably the proposed program.

THE WHITE HOUSE, *June 23, 1958.*

APPENDIX B

INTERNATIONAL AGREEMENT

Submitted to Congress by the President pursuant to provisions of sections 11 (L) and 124 of the Atomic Energy Act of 1954, as amended:

AGREEMENT BETWEEN THE GOVERNMENT OF THE UNITED STATES OF AMERICA AND THE EUROPEAN ATOMIC ENERGY COMMUNITY (EURATOM)

WHEREAS the European Atomic Energy Community (Euratom) has been established by the Kingdom of Belgium, the Federal Republic of Germany, the French Republic, the Italian Republic, the Grand Duchy of Luxembourg, and the Kingdom of the Netherlands, in the Treaty of Rome signed on March 25, 1957, with the aim of contributing to the raising of the standard of living in Member States and to the development of commercial exchanges with other countries by the creation of conditions necessary for the speedy establishment and growth of nuclear industries;

WHEREAS the Government of the United States of America has instituted a program of international cooperation to make available to cooperating nations the benefits of peaceful applications of atomic energy as widely as expanding technology and considerations of the common defense and security will permit;

WHEREAS the Government of the United States of America and the European Atomic Energy Community (Euratom) have expressed their mutual desire for close cooperation in the peaceful applications of atomic energy, and the European Atomic Energy Community (Euratom) intends to foster an extensive program which promises to redound to their common benefit;

WHEREAS an arrangement providing for cooperation in the peaceful applications of atomic energy would initiate a fruitful exchange of experience and technical development, open a new era for mutually beneficial action on both the government and industrial level, and reinforce solidarity within Europe and across the Atlantic;

The Parties agree as follows:

ARTICLE I

The Parties will cooperate in programs for the advancement of the peaceful applications of atomic energy. Such cooperation will be undertaken from time to time pursuant to such terms and conditions as may be agreed and shall be subject to all provisions of law respectively applicable to the Parties. Specifically it is understood that under existing law the cooperation extended by the Government of the United States of America will be undertaken pursuant to an Agreement for Cooperation entered into in accordance with Section 123 of the Atomic Energy Act of 1954, as amended.

ARTICLE II

As used in this Agreement, "Parties" means the Government of the United States of America and the European Atomic Energy Community (Euratom), acting through its Commission. "Party" means one of the Parties.

ARTICLE III

This Agreement shall enter into force on the day on which each Party shall have received from the other Party written notification that it has complied with all statutory and constitutional requirements for the entry into force of such Agreement.

IN WITNESS WHEREOF, the undersigned representatives duly authorized thereto have signed this Agreement.

DONE at Brussels on May 29, 1958, and at Washington on June 19, 1958, in duplicate, in the English, French, German, Italian, and Netherlands languages, each language being equally authenic.

For the Government of the United States of America:

JOHN FOSTER DULLES
LEWIS L. STRAUSS

For the European Atomic Energy Community (Euratom):

L. ARMAND
ENRICO MEDI
L. KREKELER
EMANUEL SASSEN
P. DE GROOTE

APPENDIX C

MEMORANDUM OF UNDERSTANDING

This document, developed by the joint United States and Euratom working party and negotiated as a first step in reaching an understanding with respect to the proposed joint United States and Euratom program, served as a basis for negotiations leading to the agreement for cooperation.

MEMORANDUM OF UNDERSTANDING REGARDING THE JOINT NUCLEAR POWER PROGRAM PROPOSED BETWEEN THE EUROPEAN ATOMIC ENERGY COMMUNITY (EURATOM) AND THE UNITED STATES OF AMERICA

The steps taken by the Member States of the European Atomic Energy Community (Euratom) towards a united Europe and the consistent support of the United States for their efforts are an acknowledgment that, in a world being rapidly transformed by technical and political change, the problems our countries face call for increasing solidarity.

The Member States of EURATOM urgently need nuclear power to be in a position to meet future energy requirements and to assure continued economic progress.

Both Euratom and the United States must carry through the nuclear revolution in industry with maximum speed and efficiency in order to remain in the forefront of progress and to open new horizons for further economic and social advance.

In order to achieve these objectives a large-scale joint development program of power reactors will be launched.

Euratom will benefit by the experience and capacity which the United States can provide to make a quick start on such a program. This will in turn provide the United States with the opportunity to accelerate its own industrial development of nuclear power for peaceful purposes by associating itself with the program. Conventional energy is generally more costly in Europe than in the United States, so that nuclear power approaches the competitive range of energy costs in Europe, a stage which will be reached only later in the United States.

For these reasons, the Commission of the European Atomic Energy Community and the Government of the United States of America have agreed to this Memorandum of Understanding which outlines a joint United States-EURATOM development program of large-scale nuclear power reactors to be constructed in the European Atomic Energy Community in the next few years.

The aim of the joint program will be to bring into operation in the Community by 1963 about 1,000,000 electrical kilowatts of installed nuclear capacity in reactors of proven types developed in the United States, thus increasing substantially the total capacity envisaged by existing programs in the Member States. The program is consistent with, and in fact a point of departure towards, the program outlined in "A Target for Euratom".*

*Report submitted by Mr. Louis Armand, Mr. Franz Etzel and Mr. Francesco Giordani at the request of the Governments of Belgium, France, the Federal Republic of Germany, Italy, Luxembourg and the Netherlands.

It is understood that the establishment and initiation of the joint program is subject to appropriate statutory steps, including authorization by the competent bodies of the Community and of the Government of the United States.

The joint program will be conducted so as to obtain the maximum support of the industries of the Community and the United States; indeed, their active participation is indispensable to the success of the program.

It is the hope and expectation of the Commission and the Government of the United States that the proposed program will lead to further cooperation between the Community and the United States in other fields related to the peaceful uses of atomic energy.

They also see in the joint program a new type of cooperation among allies on a fully equal footing based on organic links forged by common effort, and holding out hopes of new steps for the further development of the Atlantic Community.

The Commission of the European Atomic Energy Community and the Government of the United States reaffirm their dedication to the objectives of the International Atomic Energy Agency and intend that the results of their program will benefit the Agency and the nations participating in it.

1. OBJECTIVES

The objectives of the joint program will be:

A. To bring into operation by 1963, within the European Atomic Energy Community, large-scale power plants using nuclear reactors of proven types, on which research and development has been carried to an advanced stage in the United States, having a total installed capacity of approximately one million kilowatts of electricity and under conditions which would approach the competitive range of conventional energy costs in Europe.

B. To initiate immediately a joint research and development program centered on these types of reactors.

2. SELECTION AND APPROVAL UNDER THE PROGRAM

Under the joint program, reactor projects may be proposed, constructed and operated by private or governmental organizations engaged in the power industry or in the nuclear energy field.

The Commission and the Government of the United States will establish jointly, technical standards and criteria (including those relating to radiation protection and reactor safety) and the procedures for selection and approval of reactor projects under this program.

In the evaluation and selection of such reactor projects, the technical and economic features will be considered and approved jointly by the Commission and the United States Government.

Other features of such reactor projects will be considered and approved by the Commission.

Reactors now being planned or constructed in Member States of the Community will be eligible for, and will receive, early consideration under the criteria established pursuant to this section.

It is intended to take and announce decisions on the above matters at the earliest practicable date.

3. CAPITAL COSTS

The total capital cost* of the nuclear power plants with an installed capacity of approximately one million kilowatts of electricity to be constructed under the program is presently estimated not to exceed the equivalent of $350,000,000 to be financed as follows:

A. Approximately $215,000,000 to be provided by the participating utilities and other European sources of capital, such financing to be arranged with the appropriate assistance of Euratom; and

B. Up to $135,000,000 to be provided by the United States Government to Euratom in the form of a long-term line of credit on terms and conditions to be agreed, such funds to be re-lent by Euratom for the construction of facilities under this program.

4. FUEL CYCLES

The Commission and the Government of the United States will enter into special arrangements with respect to the fuel cycles for reactors to be constructed and operated under the proposed program according to the principles set forth in Attachment A to this memorandum.

*Exclusive of the fuel inventory

5. CHEMICAL PROCESSING

The United States Atomic Energy Commission is prepared to process in its facilities, at established U. S. domestic prices, spent fuel elements from the reactors to be included in the present program. The United States Atomic Energy Commission agrees to assist in the development of chemical processing techniques in Europe by providing technical advice and assistance both to "Eurochemic" (which is to design and build a pilot plant at Mol, Belgium), and to the Community in the design and construction of future plants which the Community may decide to design and construct, or to sponsor.

6. RESEARCH AND DEVELOPMENT

A. The Commission and the Government of the United States intend to inititiate promptly a joint program of research and development to be conducted both in the United States and in Europe on the types of reactors to be constructed under the proposed program.

This Research and Development program will be aimed primarily at the improvement in performance of these reactors and at lowering fuel cycle costs.

It will also deal with plutonium recycling and other problems relevant to these reactors, thus contributing to the over-all advance of the nuclear power art.

The research and development program will be established for a ten (10) year period. During the first five (5) years the financial contribution of the Community and the United States will amount to about $50,000,000 each. Prior to the completion of the first five-year period, the Parties will determine the financial requirements for the remaining five-year period and will undertake to procure funds necessary to carry out the program. Funds for the second five-year period may be in the same order of magnitude.

The administration of this program will be conducted under mutually agreed arrangements.

B. In addition, both the Commission and the United States Atomic Energy Commission will push forward and extend their own research and development programs, either direct or sponsored, on all peaceful aspects of nuclear science and industry, in particular in such fields as advanced civilian reactor design, fuel technology, reactor operation, chemical processing, radioisotopes utilization, waste disposal, and public health.

Information resulting from such work outside of the joint program will be exchanged by the respective Commission fully and promptly.

7. SPECIAL NUCLEAR AND OTHER MATERIALS

The Government of the United States will make available to the Community, as needed, enriched uranium for the nuclear power reactors to be included within the proposed program, in sufficient quantity to meet inventory and operating requirements for a twenty (20) year operating period.

The Government of the United States also will provide the Community special nuclear materials as may be agreed for research and development and the operation of research and test reactors associated with the proposed power program, in sufficient quantity to meet inventory and operating requirement for a twenty (20) year operating period. In addition, source material, special reactor material and other materials needed for carrying out the program will be provided under terms and conditions to be agreed upon.

8. AVAILABILITY OF INFORMATION

A. *Nonpatentable information developed in joint program*

1) The program contemplated by this Memorandum of Understanding, including projects selected for inclusion therein, should serve to benefit other projects and programs (both private and governmental) within the Community and the United States. Accordingly, under mutually agreed arrangements, all information developed in connection with the joint program of research and development, and all information developed in connection with the selected projects, concerning designs, plans and specifications, construction costs, operations and economics, will be delivered currently to the Parties as developed and may be used, disseminated, or published by each Party for any and all purposes as it sees fit without further obligation or payment. There will be no discrimination in the dissemination or use of the information for the reason that the proposed recipient or user is a national of the United States or of any Member State of Euratom.

2) Both Commissions shall have access to the records of the participating contractors pertaining to their participation in research and development projects under the joint research and development program, or pertaining to the performance of fuel elements that are the subject of United States guarantees.

3) The Parties will further expedite prompt exchange of information through symposia, exchange of personnel, setting up of combined teams, and other methods as may be mutually agreed.

B. *Patentable Information*

As to any invention made or conceived in the course of or under the joint program of research and development:

1. The United States shall without further obligation or payment be entitled to assignment of the title and rights in and to the invention and the patents in the United States, subject to a non-exclusive, irrevocable, and royalty-free license, with the right to grant sublicenses, to the Community for all purposes.

2. The Community shall without further obligation or payment be entitled to assignment of the title and rights in and to the invention and the patents in the Community, subject to a non-exclusive, irrevocable, and royalty-free license, with the right to grant sublicenses, to the United States for all purposes.

3. With respect to title and rights in and to the invention and patents in third countries:

a. The Community, if the invention is made or conceived within the Community, or the United States, if the invention is made or conceived within the United States, shall be entitled to assignment of such title and rights, subject to a non-exclusive, irrevocable, royalty-free license, with the right to grant sublicenses, to the other for all purposes.

b. If the invention is made or conceived elsewhere, the Party contracting for the work shall be entitled to assignment of such title and rights, subject to a non-exclusive, irrevocable, royalty-free license, with the right to grant sublicenses, to the other for all purposes.

C. As to inventions and patents under paragraph B. of this Article neither Party shall discriminate in the granting of any license or sublicense for the reason that the proposed licensee or sublicensee is a national of the United States or any Member State.

D. As to patents used in the work of the joint program, other than those under paragraph B, which the United States owns or as to which it has the right to grant licenses or sublicenses, the United States will agree to grant licenses or sublicenses, covering use either in or outside the joint program, on a non-discriminatory basis to a Member State and to industry of a Member State, if the Member State has agreed to grant licenses or sublicenses as to patents used in the work of the joint program which it owns or as to which it has the right to grant licenses or sublicenses on a non-discriminatory basis to the United States and to industry of the United States, covering use either in or outside of the joint program.

E. The respective contractual arrangements of the Parties with third parties shall contain provisions that will enable each Party to effectuate the foregoing provisions of B and C as to patentable information.

F. It is recognized that detailed procedures shall be jointly established to effectuate the foregoing provisions and that all situations not covered shall be settled by mutual agreement governed by the basic principle of equivalent benefits to both Parties.

9. TRAINING

The Commission and the United States Atomic Energy Commission will work closely together to develop training programs to satisfy the requirements of the programs described in this memorandum. The United States Atomic Energy Commission will assist the Commission in satisfying these needs by making its facilities and experience available.

10. COOPERATIVE ACTIVITIES IN INDUSTRY

It is expected that the program to be initiated under the terms of this Memorandum of Understanding will increase the cooperation already existing between individuals and organizations, both privately and publicly owned, engaged in nuclear industry, in the United States and in the countries of the Community.

The Commission and the Government of the United States will use their best efforts to foster such cooperation.

11. SAFEGUARDS AND CONTROLS

Both Euratom and the United States recognize the extreme importance of assuring that all activities under the joint program shall be directed solely toward the peaceful uses of atomic energy. In accord with this objective:

A. Euratom guarantees that:

1. No material, including equipment and devices, transferred pursuant to the Agreement for Cooperation between the United States and the Community to the Community or to authorized persons within the Community will be used for atomic weapons, or for research on or development of atomic weapons, or for any other military purpose;

2. No such material will be transferred to unauthorized persons or beyond the control of the Community, except as the United States may agree to such transfer and then only if the transfer of the material is within the scope of an Agreement for Cooperation between the Government of the United States of America and another nation or group of nations;

3. No source or special nuclear material utilized in, recovered from, or produced as a result of the use of materials, equipment, or devices transferred pursuant to the Agreement for Cooperation between the United States and the Community to the Community or authorized persons within the Community will be used for atomic weapons, or for research on or development of atomic weapons, or for any other military purpose;

4. The Community will establish and maintain a mutually satisfactory system of safeguards and controls, to be applied to materials, equipment, and devices subject to the guarantees set forth in paragraphs 1 through 3 above.

B. Euratom undertakes the responsibility for establishing and implementing a safeguards and control system designed to give maximum assurance that any material, equipment, or devices made available pursuant to the Agreement between the United States and Euratom, and any source or special nuclear material derived from the use of such material, equipment or devices, shall be utilized solely for peaceful purposes. In establishing and implementing its safeguards and control system the Community is prepared to consult with and exchange experience with the International Atomic Energy Agency with the objective of establishing a system reasonably compatible with that of the International Atomic Energy Agency. The United States and Euratom will formulate and agree upon the principles which will govern the establishment and operation by Euratom of a mutually satisfactory safeguards and control system under the Agreement for Cooperation between the United States and Euratom. These principles are set forth in Attachment "B" and will be included in the text of the Agreement.

C. As has been requested by Euratom, the United States will provide assistance in establishing the Euratom safeguards and control system, and will provide continuing assistance in the operation of the system.

D. There will be frequent consultations and exchanges of visits between the Parties to give assurance to both Parties that the Euratom safeguards and control system effectively meets the responsibility and principles stated in B above and that the standards of the materials accountability systems of the United States and Euratom are kept reasonably comparable.

E. In recognition of the importance of the International Atomic Energy Agency, the United States of America and the European Atomic Energy Community will consult with each other from time to time to determine whether there are any areas of responsibility with regard to safeguards and control and matters relating to health and safety in which the Agency might be asked to assist.

F. A continuation of the cooperative program between the United States and Euratom will be contingent upon Euratom establishing and maintaining a mutually satisfactory and effective safeguards and control system which is in accord with the principles originally agreed upon.

12. THIRD PARTY LIABILITY

The Community and the Government of the United States recognize that adequate measures to protect equipment manufacturers and other suppliers as well as the participating utilities against now uninsurable risk are necessary to the implementation of the joint program. The Euratom Commission will seek to

develop and to secure the adoption, by the earliest practicable date, of suitable measures which will provide adequate financial protection against third party liability. Such measures could involve suitable indemnification guarantees, national legislation, international convention, or a combination of such measures.

13. TARIFFS

The Commission will take all action open to it under the Treaty to minimize the impact of customs duties on goods and products imported under this joint program.

14. EXISTING AGREEMENTS

Existing agreements for cooperation in the field of nuclear energy between Member States and the United States of America are not modified by the joint program, but will be subject to appropriate negotiations pursuant to article 106 of the Treaty. Modifications may be made as necessary to permit transfers of reactor projects now contemplated under existing agreements that qualify for and are accepted under the joint program.

15. ADMINISTRATION OF THE PROGRAM

In order to assure the initiation and effective execution of this program, agreement will be reached on the over-all organization needed to establish and carry out the joint program, including the establishment of such joint groups as are required.

The Commission of the European Atomic Energy Community (Euratom)	The United States of America
L. ARMAND	JOHN FOSTER DULLES
H. L. KREKELER	LEWIS L. STRAUSS
PAUL DE GROOTE	
ENRICO MEDI	
EMANUEL SASSEN	

At Brussels on May 29, 1958, and at Washington on June 12, 1958.

ATTACHMENT A TO APPENDIX C

PRINCIPLES FOR THE SPECIAL ARRANGEMENTS WITH RESPECT TO THE FUEL CYCLES FOR REACTORS TO BE CONSTRUCTED AND OPERATED UNDER THE PROGRAM

A. OBJECTIVE

The objective of the fuel cycle program is that arrangements for supplying fuel elements for the million kilowatt cooperative program will meet either criterion (1) or (2) below:

(1) The integrity of the stainless steel or zirconium clad fuel elements for light-water cooled and moderated reactors is guaranteed to an average irradiation level [1] of 10,000 megawatt days per metric ton of contained uranium [2]; and the charge [3] for fabrication of fuel elements starting with uranium hexafluoride is:

(a) $100 per kilogram of contained uranium for fuel elements made of uranium dioxide having a U–235 isotopic concentration no greater than 3% by weight, diameter between 0.25 and 0.50 inches, and stainless steel cladding; or

(b) $140 per kilogram of contained uranium for similar fuel elements clad with zirconium cladding; or

(c) appropriately adjusted charges for fuel elements having different claddings or falling outside of the limitations on size, shape, or U–235 concentration.

[1] Average irradiation level will be based on a weight of fuel equivalent to the nominal fuel loading of the reactor.

[2] Adjustments of the integrity guarantee may be required if cladding materials other than stainless steel or zirconium are used.

[3] Fabrication charges will be subject to escalation on the basis of a mutually determined index.

Note: For each type of fuel element, there will be computed, as mutually agreed, "computed fuel cycle costs" based on guaranteed average irradiation levels and fabrication charges, and taking into account all charges for fuel fabrication, inventory, burnup, chemical reprocessing, and transportation and the credit for plutonium. If the irradiation level and fabrication charge used in this computation are those given in A (1), the computed fuel cycle cost is defined as the "standard fuel cycle cost".

(2) The irradiation level in the integrity guarantee and the fabrication charge for fuel elements differ from the values specified in (1), but the combination gives a computed fuel-cycle cost equal to or less than the standard fuel cycle cost.

B. GUARANTEES

1. Arrangements for supplying fuel elements that meet criterion (1) or (2) may be received from commercial sources but, in the event of failure of fuel elements, such arrangements may not sufficiently cover the extra costs of reprocessing and transporting irradiated fuel elements to meet the standard fuel-cycle cost. Under such conditions, the United States Commission will, for the purposes of prorating the chemical processing and/or transportation costs, offer to guarantee an average irradiation level, which, in combination with the guarantees offered by the manufacturer, would result in a computed fuel-cycle cost equal to the standard fuel-cycle cost. When such guarantees are made, if the average irradiation level actually attained is greater than the irradiation level guaranteed by the United States Commission, one-half of the resulting savings in costs of reprocessing and/or transporting irradiated fuel will be credited to the United States Commission, up to the sum of previous payments by the United States under this guarantee for the particular reactor concerned.

2. In the event that acceptable arrangements for supplying fuel elements meeting the criteria of A above are not received from commercial sources, the United States Commission will guarantee the fuel elements supplied under the following arrangements:

(a) If the fabrication charge guaranteed by the manufacturer is equal to or less than the value specified in A (1) above, the United States Commission will guarantee an average irradiation level which, when combined with this fabrication charge, will give a computed fuel-cycle cost equal to the standard fuel cycle cost.

(b) If the average irradiation level guaranteed by the manufacturer is equal to or greater than the value specified in A (1) above, the United States Commission will guarantee a fabrication charge which, when combined with the average irradiation level in the manufacturer's integrity guarantee, will give a computed fuel-cycle cost equal to the standard fuel-cycle cost.

(c) If the average irradiation level is less and the fabrication charge is greater in the manufacturer's guarantee than in A (1) above, the United States Commission will offer to guarantee the values in A (1).

In cases (b) and (c) above, when the average irradiation level attained exceeds that guaranteed by the United States Commission, one-half of the resulting savings in fabrication costs will be credited to the United States Commission, up to the cost of payments by the United States Commission for fabrication charges for the particular core concerned.

If the average irradiation level does not meet that guaranteed in (a), (b), or (c) above, the United States Commission will adjust the charges for fabrication, chemical reprocessing, and transportation to the level that would have been incurred had that guarantee been met.

3. Fuel-element guarantees may also be developed for proven types of reactors other than light-water cooled and moderated, determined by the Euratom Commission and the United States Commission to be eligible for consideration under the joint program.

4. The guarantees provided by the United States Commission under paragraphs 1, 2, or 3 of this section will be applicable to all loadings made in the reactor during ten years of operation or prior to December 31, 1973, whichever is earlier.

5. In determining whether a guaranteed average irradiation level has been attained, account will be taken not only of all material discharged because of actual failure of integrity, but also material whose discharge, in the joint opinion of the Euratom Commission, the United States Commission, and the fabricator involved, was required for purposes of safe operation or economic operation (assuming for the latter determination that no guarantees were in force).

6. The technical and economic criteria under which proposals will be evaluated for acceptance will include minimum standards for fabrication charge and integrity guarantee for fuel elements. These criteria will also provide, as may be agreed, that subsequent reactor cores can be furnished by other than the initial fabricators.

7. In order to qualify for the guarantees by the United States Commission provided in paragraphs 1, 2, and 3 of this section, fuel elements must be fabricated by a United States manufacturer or by a manufacturer in Euratom countries under agreement with a United States firm or firms. However, reactors under the joint program may be fueled with elements from other sources. In such cases, the United States Commission will offer to perform chemical reprocessing services at its published charges with respect to any source or special nuclear material obtained from the United States. If adequate facilities are not available in Euratom countries when needed, the United States Commission will give sympathetic consideration to furnishing reprocessing services on material not furnished by the United States Commission.

8. The United States Commission guarantees will, in general, be extended to the utility through the fabricator of the fuel. In the event that it is determined by the United States Commission that the fabricator is not meeting adequate performance standards, or, if it is mutually determined that a more advantageous source is available, other contractual arrangements will be made for supplying fuel elements under the guarantee.

Attachment B to Appendix C

Principles for Establishing the Safeguards and Control System Under the Agreement for Cooperation

The principles which will govern the establishment and operation of the safeguards and control system are as follows:

The Euratom Commission will:

1. Examine the design of equipment, devices and facilities, including nuclear reactors, and approve it for the purpose of assuring that it will not further any military purpose and that it will permit the effective application of safeguards, if such equipment, devices and facilities:

   a. are made available pursuant to this Agreement; or

   b. use, process or fabricate any of the following materials received from the United States: source or special nuclear material, moderator material or any other material relevant to the effective application of safeguards; or

   c. use any special nuclear material produced as the result of the use of equipment or material referred to in a and b.

2. Require the maintenance and production of operating records to assure accountability for source and special nuclear material made available or source or special nuclear material used, recovered, or produced as a result of the use of source or special nuclear material, moderator material or any other material relevant to the effective application of safeguards, or as a result of equipment, devices and facilities made available pursuant to this Agreement.

3. Require that progress reports be prepared and delivered to the Euratom Commission with respect to projects utilizing material, equipment, devices and facilities referred to in paragraph 2 above.

4. Establish and require the deposit and storage, under continuing safeguards, in Euratom facilities of any special nuclear material referred to in 2 above which is not currently being utilized for peaceful purposes in the Community or otherwise transferred as provided in the Agreement for Cooperation between the United States and the Community.

5. Establish an inspection organization which will have access at all times:

   a. to all places and data, and

   b. to any person, who by reason of his occupation deals with materials, equipment, devices or facilities safeguarded under this Agreement,

necessary to assure accounting for source or special nuclear material subject to paragraph 2 and to determine whether there is compliance with the guarantees of the Community. The inspection organization will also be in a position to make and will make such independent measurements as are necessary to assure compliance with the provisions of this Attachment and the Agreement for Cooperation.

It is the understanding of the Parties that the above principles applicable to the establishment of Euratom's inspection and control system are compatible with and are based on Article XII of the Statute of the International Atomic Energy Agency, Chapter VII of the Euratom Treaty, and those adopted by the Government of the United States of America in its comprehensive Agreements for Cooperation.

APPENDIX D

AGREEMENT FOR COOPERATION

The proposed Agreement for Cooperation has been negotiated pursuant to section 123 of the Atomic Energy Act and initialed by the parties. Following approval of the International Agreement by the Congress, the Agreement for Cooperation will be submitted to the President in conformance with the provisions of section 123 of the act and thereafter will be submitted to the Joint Committee.

AGREEMENT FOR COOPERATION BETWEEN THE GOVERNMENT OF THE UNITED STATES OF AMERICA AND THE EUROPEAN ATOMIC ENERGY COMMUNITY (EURATOM) CONCERNING PEACEFUL USES OF ATOMIC ENERGY

WHEREAS the Government of the United States of America and the European Atomic Energy Community (Euratom) on ---------- signed an agreement which provides a basis for cooperation in programs for the advancement of the peaceful applications of atomic energy;

WHEREAS the Government of the United States of America and the European Atomic Energy Community (Euratom) recognize that it would be to their mutual benefit to cooperate by establishing a joint program:

(a) To bring into operation by 1963, within the European Atomic Energy Community (Euratom), large-scale power plants using nuclear reactors of proven types on which research and development have been carried to an advanced stage in the United States, having a total installed capacity of approximately one million kilowatts of electricity and under conditions which would approach the competitive range of conventional energy costs in Europe;

(b) To initiate immediately a joint research and development program centered on these types of reactors;

The Parties agree as follows:

ARTICLE I

A. Under the joint program, reactor projects may be proposed, constructed and operated by private or governmental organizations in the Community engaged in the power industry or in the nuclear energy field. Such projects will be selected in accordance with technical standards, criteria (including those relating to radiation protection and reactor safety), and procedures developed by the United States Atomic Energy Commission (hereinafter referred to as the "United States Commission") and the Commission of the European Atomic Energy Community (hereinafter referred to as the "Euratom Commission"). In the evaluation and selection of such reactor projects, the technical and economic features will be considered and approved jointly by the United States Commission and the Euratom Commission. Other features of such reactor projects will be considered and approved by the Euratom Commission. Reactors now being planned or constructed in Member States of the Community will be eligible for, and will receive, early consideration under the criteria established pursuant to this paragraph.

B. The total capital cost, exclusive of the fuel inventory, of the nuclear power plants with an installed capacity of approximately one million kilowatts of electricity to be constructed under the program is estimated not to exceed the equivalent of $350,000,000 to be financed as follows:

1. Approximately $215,000,000 to be provided by the participating utilities and other European sources of capital, such financing to be arranged with the appropriate assistance of the Community; and

2. Up to $135,000,000 to be provided by the Government of the United States of America to the Community in the form of a long-term line of credit on terms and conditions to be agreed, such funds to be re-lent by the Community for the construction of facilities under this program.

C. The United States Commission and the EURATOM Commission will enter into special arrangements with respect to the fuel cycle of reactors to be constructed and operated under the joint program according to the principles set forth in Annex "A" to this Agreement.

ARTICLE II

A. The United States Commission and the Euratom Commission under mutually agreed arrangements intend to initiate a program of research and development to be conducted both in the United States and in Europe on the types of reactors to be constructed under the joint program. This research and development program will be aimed primarily at the improvement of the performance of these reactors, and at lowering fuel cycle costs. It will also deal with plutonium recycling and other problems relevant to these reactors.

B. The research and development program will be established for a ten (10) year period. During the first five (5) years the financial contribution of the Government of the United States of America and the Community will amount to about $50,000,000 each. Prior to the completion of the first five-year period the Parties will determine the financial requirements for the remaining five-year period and will undertake to procure funds necessary to carry out the program. Funds for the second five-year period may be in the same order of magnitude.

C. The administration of this program will be conducted under arrangements to be mutually agreed.

ARTICLE III

A. The United States Commission will sell to the Community uranium enriched in the isotope U–235 for use in projects designated by the Parties pursuant to the joint program up to a net amount of thirty thousand (30,000) kilograms of contained U–235 in uranium. This net amount shall be the gross quantity of contained U–235 in uranium sold to the Community less the quantity of contained U–235 in recoverable uranium which has been resold or otherwise returned to the Government of the United States of America or transferred to any other nation or international organization with the approval of the Government of the United States of America. The United States Commission will also from time to time sell to the Community such quantities of special nuclear material, in addition to the quantities of enriched uranium set forth above, as may be agreed.

B. Contracts for the sale of special nuclear materials will specify the quantities to be supplied, composition of material, compensation for material, delivery schedules and other necessary terms and conditions. Such contracts for the sale of enriched uranium for fueling power reactors under the joint program may also provide, under terms and conditions to be agreed, that payment for such enriched uranium may be made on a deferred basis. The uranium supplied hereunder for use in reactors designed for production of electric power may be enriched up to twenty percent (20%) by weight in the isotope U–235. The United States Commission, however, may, upon request and in its discretion, make a portion of the foregoing enriched uranium available as material enriched up to ninety percent (90%) for use in materials testing reactors and fesearch reactors, each capable of operating with a fuel load not to exceed eight (8) kilograms of contained U–235 in uranium, and as highly enriched material for use for research purposes.

C. It is agreed that the Community may distribute special nuclear material to authorized users in the Community; the Community will retain, pursuant to the Treaty establishing the European Atomic Energy Community, title to any special nuclear material which is purchased from the United States Commission.

D. The United States Commission is prepared to perform on terms and conditions to be agreed chemical reprocessing services with respect to any source or special nuclear material received by the Community from the United States under this program. It is agreed that such reprocessing will be performed at established United States domestic prices in effect upon delivery of such material. It is understood, except as may be otherwise agreed, that the form and content of any irradiated fuel elements shall not be altered after their removal from reactors and prior to delivery to the United States Commission or to other facilities. Special nuclear material and other material recoverable from material returned to the United States for reprocessing will be returned to the Community unless otherwise agreed.

E. With respect to any special nuclear material produced in reactors fueled with material obtained from the United States under this agreement which is in excess of the need of the Community for such materials for the peaceful uses of atomic energy, the International Atomic Energy Agency is granted the right of first option to purchase such materials at the announced fuel value price in effect in the United States at the time of purchase. In the event this option is not exercised by the International Atomic Energy Agency, the Government of the United States of America is prepared to purchase such material at the United States announced fuel value price in effect at the time of purchase.

ARTICLE IV

The United States Commission will assist the Euratom Commission in obtaining reactor materials other than special nuclear material from private organizations located in the United States if the Euratom Commission desires such assistance. If no commercial sources are available, specific arrangements may be made by the Parties, from time to time, under terms and conditions to be agreed, for the transfer of such materials.

ARTICLE V

Persons under the jurisdiction of the Government of the United States of America or within the Community will be permitted to make arrangements to transfer and export material, including equipment and devices, to, and perform services for, the other Party and such persons under the jurisdiction of the Government of the United States of America or within the Community (as the case may be) as are authorized by the appropriate Party to receive and possess such material and utilize such services, subject to applicable laws, directives, regulations and license requirements of the Government of the United States of America, the Community and the Member States of the Community.

ARTICLE VI

A. 1. Under mutually agreed arrangements, all non-patentable information developed in connection with the joint program of research and development, and all non-patentable information developed in connection with the selected projects, concerning designs, plans and specifications, construction costs, operations and economics, will be delivered currently to the Parties as developed and may be used, disseminated, or published by each Party for any and all purposes as it sees fit without further obligation or payment. There will be no discrimination in the dissemination or use of such information for the reason that the proposed recipient or user is a national of the United States or of any Member State of the Community.

2. Both Parties shall have access to the records of the participating contractors pertaining to their participation in research and development projects under the joint research and development program, or pertaining to the performance of fuel elements that are the subject of United States guarantees.

B. The United States Commission and the Euratom Commission shall also exchange other unclassified information in fields related to the peaceful uses of atomic energy to further the joint program. Such exchange of information shall include technical advice in the design and construction of future reprocessing plants which the Community may decide to design and construct or sponsor.

C. The Parties will expedite prompt exchange of information through symposia, exchange of personnel, setting up of combined teams, and other methods as may mutually agreed.

D. Except as otherwise agreed, the application or use of any information (including designs, drawings and specifications) and any material, equipment, and devices, exchanged or transferred between the Parties under this agreement, shall be the responsibility of the Party receiving it, and the other Party does not warrant the accuracy or completeness of such information, nor the suitability of such information, materials, equipment, and devices for any particular use or application.

ARTICLE VII

A. As to any invention made or conceived in the course of or under the joint program of research and development:

1. The Government of the United States of America shall without further obligation or payment be entitled to assignment of the title and rights in and to the invention and the patents in the United States subject to a non-exclu-

sive, irrevocable, and royalty-free license, with the right to grant sublicenses, to the Community for all purposes.

2. The Community shall without further obligation or payment be entitled to assignment of the title and rights in and to the invention and the patents in the Community subject to a non-exclusive, irrevocable, and royalty-free license, with the right to grant sublicenses, to the Government of the United States of America for all purposes.

3. With respect to title and rights in and to the invention and patents in third countries:

a. The Community, if the invention is made or conceived within the Community, or the Government of the United States of America, if the invention is made or conveived within the United States, shall be entitled to assignment of such title and rights, subject to a non-exclusive, irrevocable, and royalty-free license, with the right to grant sublicenses, to the other Party for all purposes.

b. If the invention is made or conceived elsewhere, the Party contracting for the work shall be entitled to assignment of such title and rights, subject to a non-exclusive, irrevocable, and royalty-free license, with the right to grant sublicenses, to the other Party for all purposes.

B. As to inventions and patents under paragraph A of this Article neither Party shall discriminate in the granting of any license or sublicense for the reason that the proposed licensee or sublicensee is a national of the United States or any Member State of the Community.

C. As to patents used in the work of the joint program, other than those under paragraph A, which the Government of the United States of America owns or as to which it has the right to grant licenses or sublicenses, the Government of the United States of America will agree to grant licenses or sublicenses, covering use either in or outside the joint program, on a non-discriminatory basis to a Member State and to industry of a Member State, if the Member State has agreed to grant licenses or sublicenses as to patents used in the work of the joint program which it owns or as to which it has the right to grant licenses or sublicenses, on a non-discriminatory basis to the Government of the United States of America and to industry of the United States, covering use either in or outside the joint program.

D. The respective contractual arrangements of the Parties with third parties shall contain provisions that will enable each Party to effectuate the provisions of paragraphs A and B of this Article as to patentable information.

E. It is recognized that detailed procedures shall be jointly established to effectuate the foregoing provisions and that all situations not covered shall be settled by mutual agreement governed by the basic principle of equivalent benefits to both Parties.

ARTICLE VIII

The United States Commission and the Euratom Commission will work closely together to develop training programs to satisfy requirements of the joint program. The Parties may under mutually agreeable terms and conditions make available their facilities for use by the other, including facilities to satisfy training needs.

ARTICLE IX

The Government of the United States of America and the Community recognize that adequate measures to protect equipment manufacturers and other suppliers as well as the participating utilities against now uninsurable risks are necessary to the implementation of the going program. The Euratom Commission will seek to develop and to secure the adoption, by the earliest practicable date, of suitable measures which will provide adequate financial protection against third party liability. Such measures could involve suitable indemnification guarantees, national legislation, international convention, or a combination of such measures.

ARTICLE X

The Euratom Commission will take all action open to it under the Treaty establishing the European Atomic Energy Community to minimize the impact of customs duties on good and products imported under the joint program.

ARTICLE XI

The Community guarantees that:

1. No material, including equipment and devices, transferred pursuant to this Agreement to the Community or to persons within the Community, will be used for atomic weapons, or for research on or development of atomic weapons, or for any other military purpose;

2. No such material will be transferred to unauthorized persons or beyond the control of the Community, except as the Government of the United States of America may agree to such transfer and then only if the transfer of the material is within the scope of an Agreement for Cooperation between the Government of the United States of America and another nation or group of nations;

3. No source or special nuclear material utilized in, recovered from, or produced as a result of the use of materials, equipment or devices transferred pursuant to this Agreement to the Community or to authorized persons within the Community will be used for atomic weapons, or for research on or development of atomic weapons, or for any other military purpose;

4. The Community will establish and maintain a mutually satisfactory system of safeguards and control as provided in Article XII, to be applied to materials, equipment and devices subject to the guarantees set forth in paragraphs 1 through 3 of this Article.

ARTICLE XII

A. The Community undertakes the responsibility for establishing and implementing a safeguards and control system designed to give maximum assurance that any material, equipment or devices made available pursuant to this Agreement and any source or special nuclear material derived from the use of such material, equipment and devices, shall be utilized solely for peaceful purposes. In establishing and implementing its safeguards and control system, the Community is prepared to consult with and exchange experiences with the International Atomic Energy Agency with the objective of establishing a system reasonably compatible with that of the International Atomic Energy Agency. The Government of the United States of America and the Community agree that the principles which will govern the establishment and operation by the Community of a mutually satisfactory safeguards and control system under this Agreement are those which are set forth in Annex B to this Agreement. The Community shall be responsible for establishing and maintaining a mutually satisfactory and effective safeguards and control system which is in accord with the principles set forth in Annex B to this Agreement.

B. As has been requested by the Community, the Government of the United States of America will provide assistance in establishing the Community's safeguards and control system, and will provide continuing assistance in the operation of the system.

C. The Parties agree that there will be frequent consultations and exchanges of visits between the Parties to give assurance to both Parties that the Community's safeguards and control system effectively meets the responsibility and principles stated in paragraph A of this Article and that the standards of the materials accountability systems of the Government of the United States of America and the Community are kept reasonably comparable.

D. In recognition of the importance of the International Atomic Energy Agency, the Government of the United States of America and the Community will consult with each other from time to time to determine whether there are any areas of responsibility with regard to safeguards and control and matters relating to health and safety in which the Agency might be asked to assist.

E. It is understood by the Parties that a continuation of the cooperative program between the Government of the United States of America and the Community will be contingent upon the Community's establishing and maintaining a mutually satisfactory and effective safeguards and control system which is in accord with the principles set forth in Annex B to this Agreement.

ARTICLE XIII

The Government of the United States of America and the Community reaffirm their common interest in fostering the peaceful applications of atomic energy through the International Atomic Energy Agency and intend that the results of the joint program will benefit the Agency and the nations participating in it.

ARTICLE XIV

A. The Parties anticipate that from time to time they may enter into further agreements providing for cooperation in the peaceful aspects of atomic energy.

B. Article 106 of the Treaty establishing the European Atomic Energy Community contemplates that Member States which before the date of entry into force of that Treaty have concluded agreements with third countries for cooperation in the field of nuclear energy shall jointly with the EURATOM Commission enter into the necessary negotiations with third countries in order as far as possible to cause the rights and obligations arising out of such agreements to be assumed by the Community. The Government of the United States of America is prepared to enter into such negotiations with reference to any agreement to which it is a party.

C. Existing agreements for cooperation in the field of nuclear energy between Member States and the Government of the United States of America are not modified by the joint program. Modifications may be made as necessary by mutual agreement between the Member States concerned and the United States to permit transfers of reactor projects now contemplated under existing agreements that qualify for and are accepted under the joint program.

ARTICLE XV

For the purposes of this Agreement:

(a) "Person" means any individual, enterprise, corporation, partnership, firm, association, trust, estate, public or private institution, group, government agency, or government corporation, but does not include the Parties to this Agreement.

(b) "Special nuclear material" means (1) plutonium, uranium enriched in the isotope 233 or in the isotope 235, and any other material which either Party determines to be special nuclear material; or (2) any material artificially enriched by any of the foregoing.

(c) "Source material" means (1) uranium, thorium, or any other material which is determined by either Party to be source material; or (2) ores containing one or more of the foregoing materials, in such concentration as either Party may determine from time to time.

(d) "Parties" means the Government of the United States of America, including the United States Atomic Energy Commission on behalf of the Government of the United States of America, and the European Atomic Energy Community (Euratom), acting through its Commission. "Party" means one of the Parties.

ARTICLE XVI

A. The Parties agree that the establishment and initiation of the joint program and the undertakings of the Parties under this Agreement are subject to appropriate statutory steps, including authorization by competent bodies of the Government of the United States of America and the Community, and the provisions of applicable laws, regulations and license requirements in effect in the United States and in the Community and within the Member States.

B. This Agreement shall enter into force on the day on which each Party shall have received from the other Party written notification that it has complied with all statutory and constitutional requirements for the entry into force of such Agreement and shall remain in force for a period of twenty-five (25) years.

IN WITNESS WHEREOF, the undersigned representatives duly authorized thereto have signed this Agreement.

DONE at _____ in duplicate, in the English, French, German, Italian and Netherlands languages, each language being equally authentic, this ____ day of _____, 1958.

For the Government of the United States of America:

Initialed on June 19, 1958 by John Foster Dulles
Lewis L. Strauss

For the European Atomic Energy Community (Euratom):

Initialed on May 29, 1958 by Louis Armand
Heinz L. Krekeler
Emanuel Sassen
Paul de Groote
Enrico Medi

ANNEX A

With the objective of assuring the success of the joint program, the United States Commission will offer guarantees designed to limit certain financial risks associated with the fuel cycle.

These guarantees will be extended in the form of maximum charges for fabrication of the fuel elements and minimum integrity of the fuel elements under irradiation. They will be offered only to the extent that equivalent or better guarantees are not available commercially.

The liability of the United States Commission under these guarantees will be limited to meeting guaranteed maximum charges for fabricated fuel elements and to the adjustment of charges for fabrication, chemical reprocessing, and transportation of fuel elements when required by failure to meet guaranteed integrity.

The guarantees will provide for equitable sharing of decreases in costs realized through fuel performance in excess of guaranteed levels, the United States share not to exceed costs experienced by the United States Commission under these guarantees.

The guarantees provided by the United States Commission will be applicable to all loadings made in reactors under the joint program during ten years of operation or prior to December 31, 1973, whichever is earlier.

ANNEX B

Principles for Establishing the Safeguards and Control System Under This Agreement

The principles which will govern the establishment and operation of the safeguards and control system are as follows:

The Euratom Commission will:

1. Examine the design of equipment, devices and facilities, including nuclear reactors, and approve it for the purpose of assuring that it will not further any military purpose and that it will permit the effective application of safeguards, if such equipment, devices and facilities:
   (a) are made available pursuant to this Agreement; or
   (b) use, process or fabricate any of the following materials received from the United States: source or special nuclear material, moderator material or any other material relevant to the effective application of safeguards; or
   (c) use any special nuclear material produced as the result of the use of equipment or material referred to in subparagraphs (a) and (b).
2. Require the maintenance and production of operating records to assure accountability for source or special nuclear material made available, or source or special nuclear material used, recovered, or produced as a result of the use of source or special nuclear material, moderator material or any other material relevant to the effective application of safeguards, or as a result of equipment, devices and facilities made available pursuant to this Agreement.
3. Require progress reports be prepared and delivered to the Euratom Commission with respect to projects utilizing material, equipment, devices and facilities referred to in paragraph 2 of this Annex.
4. Establish and require the deposit and storage, under continuing safeguards, in Euratom facilities of any special nuclear material referred to in paragraph 2 of this Annex which is not currently being utilized for peaceful purposes in the Community or otherwise transferred as provided in the Agreement for Cooperation between the Government of the United States of America and the Community.
5. Establish an inspection organization which will have access at all times:
   (a) to all places and data, and
   (b) to any person who by reason of his occupation deals with materials, equipment, devices or facilities safeguarded under this Agreement,

necessary to assure accounting for source or special nuclear material subject to paragraph 2 of this Annex and to determine whether there is compliance with the guarantees of the Community. The inspection organization will also be in a position to make and will make such independent measurements as are necessary to assure compliance with the provisions of this Annex and the Agreement for Cooperation.

It is the understanding of the Parties that the above principles applicable to the establishment of the Community's inspection and control system are compatible with and are based on Article XII of the Statute of the International Atomic Energy Agency, Chapter VII of Title Two of the Treaty establishing the European Atomic Energy Community, and those adopted by the Government of the United States of America in its comprehensive Agreements for Cooperation.

APPENDIX E

DRAFT BILL [4]

The draft bill covers the legislation and authorization necessary to permit the Atomic Energy Commission to carry out the undertakings of the United States Government in connection with the joint United States and Euratom program covered in the proposed agreement for cooperation.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, That this Act may be cited as the "Euratom Cooperation Act of 1958".

SEC. 2. As used in this Act:

(a) "The Community" means the European Atomic Energy Community (Euratom).

(b) "Joint program" means the cooperative program established by the Community and the United States to bring into operation in the territory of the members of the Community power plants using nuclear reactors of proven types selected by the United States and the Community, having a total installed capacity of approximately one million kilowatts of electricity.

SEC. 3. There is hereby authorized to be appropriated to the Atomic Energy Commission, in accordance with the provisions of section 261 (a) (2) of the Atomic Energy Act of 1954, as amended, the sum of $50,000,000 for use in a program of research and development in connection with the types of reactors selected by the Commission and the Community under the joint program. The United States may enter into contracts for such periods as it deems necessary, but in no event to exceed five years, for the purpose of conducting the research and development program authorized by this section.

SEC. 4. There is hereby authorized to be appropriated to the Atomic Energy Commission, in accordance with the provisions of section 261 (a) (2) of the Atomic Energy Act of 1954, as amended, the sum of $90,000,000 for use in a program designed to assure that the charges to an operator, of a reactor constructed under the joint program, for fabricating, processing, and transporting fuel will be no greater than would result under the fuel fabricating and fuel life guaranties which the Commission establishes for such reactor. Within the limit of such amount, the Commission is authorized to make contracts under this section, without regard to the provisions of sections 3679 and 3709 of the Revised Statutes, as amended, for such periods of time as it determines to be necessary: *Provided, however,* That no such contracts may extend for a period longer than that necessary to cover fuel loaded into a reactor constructed under the joint program during the first ten years of the reactor operation or prior to December 31, 1973, whichever is earlier.

SEC. 5. Pursuant to the provisions of section 54 of the Atomic Energy Act of 1954, as amended, there is hereby authorized for distribution to the Community:

Thirty thousand kilograms of contained uranium 235

One kilogram of plutonium

in accordance with the provisions of an agreement for cooperation between the Government of the United States and the Community entered into pursuant to the provisions of section 123 of the Atomic Energy Act of 1954, as amended.

SEC. 6. The Atomic Energy Commission may enter into contracts in accordance with the terms of an agreement for cooperation with the Community entered into pursuant to the provisions of section 123 of the Atomic Energy Act of 1954, as amended, for such periods of time as the Commission may deem necessary or desirable, to provide for the processing, fabricating, separating or refining in facilities owned by the Atomic Energy Commission of source, byproduct, or other material or special nuclear material: *Provided, however,* That the charges

[4] This bill has been introduced, by request, as H. R. 13119 and S. 4047.

for such services shall be no less than the then current published charges established by the Commission pursuant to section 161 m. of the Atomic Energy Act of 1954, as amended, for the performance of these services for persons licensed under section 103 or 104 of the Atomic Energy Act of 1954, as amended.

SEC. 7.—(a) The Atomic Energy Commission is authorized to purchase or otherwise acquire from the Community special nuclear material or any interest therein in accordance with the terms of an agreement for cooperation entered into pursuant to the provisions of section 123 of the Atomic Energy Act of 1954, as amended: *Provided*, That neither plutonium nor uranium 233 nor any interest therein shall be acquired under this section in excess of the total quantities authorized by law. The Commission is hereby authorized to acquire from the Community pursuant to this section up to four thousand one hundred kilograms of plutonium for use only for peaceful purposes.

(b) Any contract made under the provisions of this section to acquire plutonium or any interest therein may be at such prices and for such period of time as the Commission may deem necessary: *Provided*, That with respect to plutonium produced in any reactor constructed under the joint program, no such contract shall be for a period greater than ten years of operation of such reactors or December 31, 1973, whichever is earlier: *And provided further*, That no such contract shall provide for compensation or the payment of a purchase price in excess of the Commission's established price in effect at the time of delivery to the Commission for such material as fuel in a nuclear reactor.

(c) Any contract made under the provisions of this section to acquire uranium enriched in the isotope uranium 235 may be at such price and for such period of time as the Commission may deem necessary: *Provided*, That no such contract shall be for a period of time extending beyond the terminal date of the agreement for cooperation with the Community or provide for the acquisition of uranium enriched in the isotope uranium 235 in excess of the quantities of such material that have been distributed to the Community by the Commission less the quantity consumed in the nuclear reactors involved in the joint program: *And provided further*, That no such contract shall provide for compensation or the payment of a purchase price in excess of the Atomic Energy Commission's established charges for such material in effect at the time delivery is made to the Commission.

(d) Any contract made under this section for the purchase of special nuclear material or any interest therein may be made without regard to the provisions of section 3679 of the Revised Statutes, as amended.

(e) Any contract made under this section may be made without regard to section 3709 of the Revised Statutes, as amended, upon certification by the Commission that such action is necessary in the interest of the common defense and security, or upon a showing by the Commission that advertising is not reasonably practicable.

(f) Partial and advance payments or deliveries may be made under contracts authorized under this section.

SECTION 8. After having received an agreement for cooperation with the Community submitted pursuant to Section 123 c. of the Atomic Energy Act of 1954, as amended, the Joint Committee on Atomic Energy may by resolution in writing waive the conditions of or all or any portion of the thirty-day period period prescribed in such section.

APPENDIX F

SUMMARY OF FUNDING—JOINT UNITED STATES AND EURATOM COOPERATIVE PROGRAM

Covers a brief summary of the authorization and obligational authority required and estimated expenditures under the program on the United States side for fiscal year 1959.

See sections 4, 6, and 7 of the draft bill (appendix E) which, in accordance with section 261 (a) (2) of the Atomic Energy Act, would provide the funds and other necessary authority to carry out the special fuel-cycle arrangements. Section 3 would provide the Commission with the authority necessary to participate in the joint research and development program.

Summary of funding—Joint United States and Euratom cooperative program

	Fiscal year 1959		
	Authorization required	Obligation authority required	Estimated expenditures
Special fuel-cycle arrangements for 1,000,000-kilowatt reactor program	$90,000,000	$15,000,000	0
Joint research and development program, United States share	50,000,000	10,000,000	$2,000,000
Total authorization and funding required	140,000,000	25,000,000	2,000,000

EXPLANATORY NOTES

1. (*a*) The cost of the special fuel-cycle arrangements cannot be established precisely at this time; however, the best estimate of the probable maximum cost is $90 million over the 10-year operating period involved, with the high probability that the cost will be considerably less.

(*b*) No expenditures will be incurred under the fuel-cycle arrangements until fiscal year 1962. Thereafter, the cost would reach a peak during the first 5 years of operation—1963 through 1968—and, by reason of experience and improvements in technology, should gradually taper off to zero in 1973, in the last core loadings to be made under the program.

2. Although the joint research and development program would be established for a 10-year period, authorization funds would be requested at this time only for the first 5 years. Prior to the completion of this 5-year period, Euratom and the United States would determine the financial requirements for the remaining 5-year period and would undertake to procure funds necessary to carry out the program. Funds for the second 5-year period may be in the same order of magnitude.

3. Under the proposal to purchase plutonium in excess of the amounts retained by Euratom for peaceful purposes, the maximum expenditure through the first 10 years of operation is estimated to be $50 million corresponding to 4,100 kilograms of plutonium. The actual expenditure will be dependent on the amounts retained by Euratom or acquired by the International Agency under its first option to acquire plutonium in excess of the amounts retained by Euratom.

4. The Export-Import Bank will extend a long-term line of credit of up to $135 million at 4½ percent interest to cover a portion of the total capital costs. Approximately $215 million is to be provided by participating utilities and other European sources of capital with financing to be arranged with the appropriate assistance of the Community.

5. The Atomic Energy Commission will sell to Euratom a net quantity of 30,000 kilograms of contained U–235 in uranium to cover the fueling and other requirements of the program for such materials over a 20-year operating period. The initial operating inventory, which amounts to approximately 9,000 kilograms of contained U–235, will be sold to the Community on a deferred payment basis at the domestic prices in effect in the United States at the time of transfer. Payment by the Community on the principal may be deferred for a period not to extend beyond December 31, 1973, with interest to be paid on this debt at 4 percent per annum. After the deferral period, Euratom will start paying, in equal annual installments, the debt incurred for fuel plus interest at 4 percent per annum on the unpaid balance. These payments will have to be completed by December 31, 1983. The balance of about 20,000 kilograms to be sold to Euratom, which represents estimated burnup and process losses over the 20-year operating period and 1,000 kilograms to provide for research and test reactors associated with the program would be paid for on a current basis.

6. It is estimated that the net revenue [1] from enriched uranium sold for replacement fuel during the first 10 years of operation of the 1 million kilowatt Euratom program would be in excess of $90 million. This would be almost twice the $50 million expenditures required to cover repurchase of all plutonium estimated to be recovered from reprocessed spent fuel from these reactors during the 10-year period.

[1] Net revenue is the difference between the charge for continuing enriched-uranium requirements in addition to the initial inventory, and the credits for uranium returned after irradiation, based on the United States published schedule of charges.

APPENDIX G

LETTERS EXCHANGED IN CONNECTION WITH THE JOINT UNITED STATES-EURATOM PROGRAM

The following letters were exchanged by the principal negotiators to clarify various facets of the joint program:

1. Exchange on "proven types" of reactors,
2. Letter concerning price of enriched uranium that would be furnished by the United States,
3. Letter concerning lease,
4. Letter concerning use of plutonium purchased by the United States, and
5. Exchange of letters on safeguards and control and the International Atomic Energy Agency.

JUNE 18, 1958.

His Excellency Ambassador W. WALTON BUTTERWORTH,
United States Representative to the European Atomic Energy Community, Luxembourg.

DEAR MR. AMBASSADOR: As you are aware, in the course of the final negotiations on the text of the Memorandum of Understanding regarding the joint nuclear power program proposed between the European Atomic Energy Community (Euratom) and the United States of America, the question was raised as to the intent of the Parties regarding section 11 D of the Memorandum. Section 11 D provides for frequent consultation and exchanges of visits between the Parties to give assurance to both Parties that the Euratom safeguards and control system effectively meets the responsibility and principles for the peaceful uses of atomic material stated in the Memorandum and that the standards of the materials accountability systems of the United States and Euratom are kept reasonably comparable.

I wish to confirm the understanding of the Euratom Commission that the consultations and exchanges of visits agreed upon in the referenced section and the assurance provided for therein include within those terms permission by each Party for the other Party to verify, by mutually approved scientific methods, the effectiveness of the safeguards and control systems applied to nuclear materials received from the other Party or to fissionable materials derived from these nuclear materials. In the Commission's judgment, this understanding is implicit in the text of the Memorandum of Understanding.

I wish further to confirm the Commission's understanding that with respect to Section 11 E, in the event of the establishment of an international safeguards and control system by the International Atomic Energy Agency, the United States and Euratom will consult regarding assumption by that Agency of the safeguard and control over the fissionable material utilized or produced in implementation of the program contemplated by the Memorandum of Understanding.

Sincerely yours,

MAX KOHNSTAMM.

JUNE 18, 1958.

MAX KOHNSTAMM, Esquire,
18 rue Aldringer, Luxembourg.

DEAR MR. KOHNSTAMM: As you are aware, in the course of the final negotiations on the text of the Memorandum of Understanding regarding the joint nuclear power program proposed between the European Atomic Energy Community (Euratom) and the United States of America, the question was raised as to the intent of the Parties regarding section 11 D of the Memorandum. Section 11 D provides for frequent consultation and exchanges of visits between the Parties to give assurance to both Parties that the Euratom safeguards and control system effectively meets the responsibility and principles for the peaceful uses of atomic materials stated in the Memorandum and that the standards of the materials accountability systems of the United States and Euratom are kept reasonably comparable.

I wish to confirm the understanding of my government that the consultations and exchanges of visits agreed upon in the referenced section and the assurance provided for therein include within those terms permission by each Party for the other Party to verify, by mutually approved scientific methods, the effectiveness of the safeguards and control systems applied to nuclear materials received from the other Party or to fissionable materials derived from these nuclear materials. In the Commission's judgment, this understanding is implicit in the text of the Memorandum of Understanding.

I wish further to confirm my government's understanding that with respect to Section 11 E, in the event of the establishment of an international safeguards and control system by the International Atomic Energy Agency, the United States and Euratom will consult regarding assumption by that Agency of the safeguard and control over the fissionable material utilized or produced in implementation of the program contemplated by the Memorandum of Understanding.

Sincerely yours,

/s/ Ambassador BUTTERWORTH.

JUNE 18, 1958.

MAX KOHNSTAMM, Esquire,
18 rue Aldringer, Luxembourg.

DEAR MR. KOHNSTAMM: In answer to your request for confirmation of your understanding regarding the purpose for which plutonium may be used which is bought back by the United States under the US-Euratom joint program, I am authorized to inform you that any plutonium purchased by the United States under the terms of the agreement for cooperation with Euratom will be used solely for peaceful purposes, in accordance with the policy expressed by President Eisenhower in his statement of November 18, 1956.

Sincerely yours,

Ambassador BUTTERWORTH.

COMMUNAUTE EUROPEENNE DE L'ENERGIE ATOMIQUE (EURATOM),
LA COMMISSION,
Washington, D. C., May 8th, 1958.

Mr. RICHARD W. COOK,
Deputy General Manager, Atomic Energy Commission.
Washington 25, D. C.

DEAR MR. COOK: The proposed program of cooperation between the European Atomic Energy Community (Euratom) and the Government of the United States of America as reflected in the Memorandum of Understanding states that one of the prime objectives of the Parties will be

> "To bring into operation by 1963, within the European Atomic Energy Community, large-scale power plants using nuclear reactors of proven types on which research and development has been carried to an advanced stage in the United States, having a total installed capacity of approximately one million kilowatts of electricity and under conditions which would approach the competitive range of conventional energy costs in Europe."

I would like to take this occasion to state my understanding of the meaning of the phrase "reactors of proven types on which research and development have been carried to an advanced stage in the United States" as it emerged from our discussion, to insure that my interpretation coincides with yours.

Insofar as the proposed joint program with the United States is concerned the Euratom Commission has concluded that the program should be restricted to nuclear power reactors of proven types developed to an advanced state of technology within the United States. In terms of the current state of technology this would mean that initially the program would be oriented primarily towards large-scale nuclear power plants employing reactors of the pressurized and boiling water types. I emphasize the word "primarily" inasmuch as I believe that it would be unwise to forgo the consideration of other types of reactors (e. g. the organic moderated concept) that may meet the criterion of "proven types" developed in the United States and thus meet the objectives of the joint program. Any such proposals, in our judgment, should receive due consideration by the Euratom Commission and the Government of the United States of America in the course of the implementation of the program.

I would appreciate receiving your confirmation that my understanding in this regard coincides with your interpretation.

Sincerely yours,

/s/ M. KOHNSTAMM,
Chief, Euratom Delegation.

UNITED STATES ATOMIC ENERGY COMMISSION,
Washington 25, D. C., June 12, 1958.

Mr. MAX KOHNSTAMM,
Chief, Euratum Delegation,
European Atomic Energy Community,
Rue Belliard, Brussels, Belgium.

DEAR MR. KOHNSTAMM: This is in reply to your letter to me of May 8, 1958, and confirms that my understanding in this regard coincides with your interpretation.

We agree that the program must be sufficiently flexible to provide for the consideration of other types of reactors in addition to the boiling water and the pressurized water varieties.

As you know, the guarantees now specified in Attachment "A" to the Memorandum of Understanding apply only to fuel elements meeting the specifications set forth therein, and considered acceptable for use in reactors of proven type. However, in this connection, the Atomic Energy Commission is prepared, at such time as sufficient technical information is available, to develop guarantees for fuel elements having specifications different from those given in the Attachment which are to be used in reactors of proven type.

Sincerely yours,

R. W. COOK
Deputy General Manager.

UNITED STATES ATOMIC ENERGY COMMISSION,
Washington 25, D. C., June 12, 1958.

Mr. MAX KOHNSTAMM,
Chief, Euratom Delegation,
European Atomic Energy Community,
Rue Belliard, Brussels, Belgium.

DEAR MR. KOHNSTAMM: In connection with your inquiry concerning the price of enriched uranium that would be furnished by the United States under the Joint Program the President of the United States announced on November 18th, 1956, that "the United States will make available to other nations supplies of nuclear fuel at prices identical with those charged by the Atomic Energy Commission under our domestic power program". On the same date a statement was issued by Mr. Strauss, Chairman of the United States Atomic Energy Commission, which established a schedule of charges for uranium 235 furnished by the Commission to other nations or groups of nations for use in power or research reactors. The charges are the same as those made by the Commission to domestic users on which the 4% domestic lease charge is based.

The Memorandum of Understanding and the Agreement for Cooperation are based on the charges for uranium 235 furnished by the Commission being on the same basis as those made by the Commission to domestic users.

Sincerely yours,

R. W. COOK,
Deputy General Manager.

UNITED STATES ATOMIC ENERGY COMMISSION,
Washington, D. C., June 12, 1958.

Mr. MAX KOHNSTAMM,
Chief, Euratom Delegation,
European Atomic Energy Community,
Rue Belliard, Brussels, Belgium.

DEAR MR. KOHNSTAMM: This letter is to confirm our telephone conversation of May 14, 1958.

When the United States Atomic Energy Commission first considered the proposed joint Euratom-United States program, it was determined that the Commission would be prepared to lease to Euratom the enriched uranium which would

be required for the 1,000,000 kilowatt program. This offer was discussed with your Euratom Commission in Paris in February.

In the March meetings, in Luxembourg, we were informed that under the present Euratom policy a leasing arrangement probably could not be worked out, but that Euratom would like to obtain the fuel material on a deferred payment plan. Accordingly, we are now submitting such a plan for formal approvals.

If the Euratom policy were to change, prior to deliveries of enriched uranium under the deferred payment plan, the United States Atomic Energy Commission would be willing to consider appropriate modifications to the Euratom-United States Agreement for Cooperation to allow a mutually satisfactory leasing arrangement to be made. This modification could also provide for conversion from lease to sale as may be mutually agreed.

Sincerely yours,

R. W. Cook,
Deputy General Manager.

Appendix H

Joint United States and Euratom Working Party

WORKING PAPERS OF THE JOINT UNITED STATES AND EURATOM PARTY

The attached working papers were developed by the parties in order set forth the agreed views of the parties with regard to certain details of the joint program.

WORKING PAPER I

Chapter One

NEED FOR A PROGRAM OF CONSTRUCTION AND OPERATION OF DEVELOPMENT POWER REACTORS IN EURATOM COUNTRIES

The development of a nuclear industry in most Euratom countries has been relatively slow, up to now, for lack of practical experience both in construction and operation of full-scale power reactor plants.

In order to speed up this development, it is necessary—

1. That the economic feasibility of nuclear power be proven, not by theory and calculation, not by extrapolation from pilot-plant operation, but by full-scale operation of power-producing units on a scale large enough to assure statistical reliability of the data;
2. That the utilities, into whose grid the power from these nuclear plants must flow, become familiar with the technical and management problems of operating nuclear stations and accept, with confindence, nuclear power-plants;
3. That European equipment manufacturers gain knowledge and competence in the production of reactor components;
4. That the various service industries, such as fuel production and fabrication, scrap recycle, irradiated fuel reprocessing, etc., be developed as economic operations.

Chapter Two

THE SCOPE OF THE PROGRAM

There are many factors which have an important bearing on the magnitude of the reactor construction and operation program. Most important, it must be of such a size that it will—

1. Assure that the technical and economic data obtained from the program have statistical significance not only with respect to the entire program, but also with respect to factors which are peculiar to individual countries;
2. Involve into early construction of nuclear plants and parts thereof, all European industries which do actually have the potential capacity for such an undertaking;
3. Bring a sufficient number of operating utilities into the program to assure that management in this industry is universally ready to accept nuclear energy and to enter the long-range program with wholehearted support.

Taking into account the nuclear-power projects already in existence in the various European countries, these criteria seem to suggest that a program of 6 to 8 additional reactors, properly distributed among several Euratom nations, would be most effective.

These units should be of a size that is consistent with the practice of the several nations, and would probably vary from station to station, but mostly fall within the range of 100–200 electrical megawatts.

Thus, the total capacity of the program would be in the range of 600–1,600 electrical megawatts, but it is expected that the total will fall near the middle of this range. Thus, for the purpose of gross calculations, estimated fuel requirements (see Working Paper II), total estimated costs, etc., the program should be given a nominal rating of a million kilowatts.

The program must be timed to be consistent with achievement of the overall goal of Euratom to have up to 15 million electrical kilowatts of nuclear power installed late in the 1960's and an ever-expanding program thereafter. Furthermore, its schedule must be such as to enable all nuclear industries in the Community interested in nuclear development to participate from the beginning.

To do this, the construction program must be on a schedule limited only by the abilities of the equipment manufacturers and utilities.

A target schedule under which projects are selected no later than 1959 and construction is completed no later than 1963 seems to meet this situation.

Since the basic objectives of this program are to add to the proof of the economic feasibility of nuclear power stations and to help develop the industrial complex necessary for expansion, it should be based on technology which has already been proven, by operation of pilot and prototype plants, to be technically and scientifically feasible. Reactor types chosen must have already shown that they are capable of operating with reasonable plant factors and that they may be considered as part of an integrated system.

Such requirements at this time are met by the selection for this program of water-type reactors, either pressurized or boiling, using slightly enriched uranium, since natural uranium reactors, graphite moderated, are already widely included in the various national plans.

A program of the scope so defined so reinforces the local plans already in existence as certainly to support industries engaging in fuel element fabrication and in auxiliary lines (control mechanisms, electronics, special materials, use of fission products, radiation, etc.).

In particular it might well warrant the construction of a chemical treatment plant for the processing of spent fuel, or the adaptation of existing such plants.

It is much too early to try to evaluate now the effect of such developments on the price breakdown presented in Working Paper III.

Chapter Three

Relationship of the Cost of Nuclear Power to Conventional Power

In an effort to determine the limits to be expected on the cost of electricity from nuclear power several cases were examined. (See Working Paper III.) The conclusions from these studies are—

1. The economic status of nuclear power, as defined by comparison with the cost of power from new conventional thermal plants, remains essentially as found in "A Target for Euratom." However, trends in power price from conventional oil- or coal-power stations point to lower cost than was anticipated a year ago.

2. The investment costs for the initial nuclear plants can be expected to be somewhat more than twice that of conventional thermal plants. Recent experience in the United States not only substantiates the capital cost picture given in the "Target for Euratom" but provides reasonable assurance that the cost of foreign construction of United States reactors will fall within the range of $250–$350 per kilowatt.

It is not fully clear, however, to what extent the recent very encouraging news on the performance of experimental and prototype water reactors are reflected in the capital costs as quoted here and in Working Paper III.

3. The nuclear-fuel costs represent a major uncertainty on the cost of power. The predominant factors contributing to this uncertainty are fuel performance and the cost of fuel fabrication. A reasonable range on these factors in light of today's experience give fuel costs of 4–5 mills per kilowatt-hour, about two-thirds the cost of conventional fuel, if one assumes lease of fuel at 4 percent (or arrangements with equivalent economic effect) and

purchase of plutonium metal at $12 per gram. Reasonably achievable progress on these factors during the early years of the plants' operation should lead to fuel costs in the range of 2–3 mills per kilowatt-hour. Such fuel costs would afford a cost of power in the range of 10–14 mills per kilowatt-hour, with capital costs and charges as stated above and as listed in Working Paper III.

Chapter Four

GUARANTEES AND INCENTIVES

We are thus faced by two essential facts, leading to apparently opposite conclusions:

(*a*) On the one hand, results significant from both the technical and economic point of view require the rapid setting up of a large production capacity.

(*b*) This involves big investment and operating expenses resulting, initially at least, in power production at costs substantially higher than those of conventional power stations.

Guarantees and incentives are therefore necessary and the following measures are proposed subject to necessary United States administrative approval and legislative action:

Guarantees

1. The reactors now considered will use slightly enriched uranium fuel. The United States Atomic Energy Commission would guarantee full supply of this special material for 20 years' operation. At the option of Euratom, this material would either be sold at the published United States domestic charges or leased at the 4 percent domestic-use charge. The United States would be willing to purchase the plutonium generated from this material at its established fuel price.

2. The United States Atomic Energy Commission would guarantee cost and performance of fuel elements (fabricated by a United States manufacturer or by a manufacturer in Euratom countries under agreement with a United States firm or firms) and would provide chemical processing and related services at published United States domestic charges as set forth in Working Paper IV.

3. The total capital cost of the nuclear-power reactors to be constructed under the program is presently estimated not to exceed the equivalent of $350,000,000 to be financed as follows:

A. Approximately $215,000,000 to be provided by the participating utilities and other European sources of capital, such financing to be arranged with the appropriate assistance of Euratom; and

B. Up to $135,000,000 to be provided by the United States to Euratom in the form of a long-term line of credit on terms and conditions to be agreed, such funds to be re-lent by Euratom for the construction of facilities under this program.

Incentives

1. The main, if relatively long-term incentive is, of course, provided by the hope that, owing in particular to the joint research and development program, both capital charges and fuel costs will decrease appreciably in a few years time; it must be emphasized that, contrary to conventional plants, existing nuclear stations can make ample use of technological development occurring after they have been put into commission.

2. Firms operating reactors built under this program may be included by Euratom and the United States Atomic Energy Commission in the research and development program defined in chapter V and financed jointly by the United States and Euratom.

3. Under agreed-upon conditions such additional equipment and operational cost as result from the research and development program referred to in chapter V may be charged to the funds made available for this program.

4. The plant operator will have full authority and responsibility for running the station according to a program agreed upon.

5. All information developed in connection with the selected projects, including research and development information and design, construction, operating, and economic data, shall be made freely and fully available to the Commission of the European Atomic Energy Community, and the Government of the United States of America, and industry in the Community and the United States.

All records of the recipient utility applicable to any project under this program, including operating and cost records, shall be available to both the Commission of the European Atomic Energy Community and the Government of the United States of America. Such separate records as are needed will be maintained for this purpose.

Chapter Five

JOINT RESEARCH AND DEVELOPMENT PROGRAM

The Euratom-United States program aimed toward the installation of approximately 1 million electrical kilowatts large-scale powerplants using nuclear reactors of proven types, has as a primary objective the achievement of economic nuclear power.

One of the best ways of assuring that this goal is reached is through the early inauguration of a joint Euratom-United States development program of sufficient size and scope to solve the technical problems.

The proposed joint development program is expected to accomplish such objectives.

Experience has shown that the major gains can be made in improving performance and lowering operating costs of large reactors if there is a companion research and development program prior to, during, and after construction of the reactors. Even in reactors built in a single "generation" there are certain improvements in the design of the reactors themselves, of major components, and of auxiliary equipment which can be incorporated in successive units. After the reactors are constructed, a strong research and development program can lead to substantial improvements in the power levels of the reactors and in the fuel cycle, which give immediate benefits in lowering unit power costs.

Developmental work on an overall reactor program must start simultaneously with the initiation of the project, and must continue through the design and construction and operational stages. Clearly, the joint development program must concern itself not only with the reactor components but also with the mechanical, chemical and metallurgical aspects of fuel preparation, the possibility of using other fuels, such as plutonium and U–233, the problems of improving the efficiency of techniques for processing spent fuel, the improvement of thermal efficiency, the methods of increasing the power output, and all other phases of reactor servicing and operation.

While this proposed joint program will be directly tied to the "million kilowatt" reactor program and will have as its primary objective the realization of economic power from this program, its results will be of obvious and important benefit to both the United States and European programs.

Notwithstanding the many water-type reactors in the United States, and the development work associated with them, the mere existence of 6 to 8 operating reactors in which the results of the joint development program may be operationally tested and from which the full operating experience will be available, will be of inestimable value in achieving economic nuclear power in the United States and in Europe. The trend toward equipment and component standardization which will be the natural result of the prototype program and the longer-range Euratom program should be a major factor in reactor economics in both Europe and the United States. The development of the ancillary industries to service the Euratom and other European programs will have a profound influence on lowering the cost of such services, both in Europe and the United States.

The research and development program is in keeping with the present policies of Western Europe and the United States to contribute to the common good by sharing of scientific and technical information and minimizing the duplication of effort by the limited pool of technical talent available.

WORKING PAPER II

Amount of U–235 Required for the 1-Million-Kilowatt Program

Consider a pressurized or boiling-water reactor having a power level of approximately 150 electrical megawatts and an irradiation level between 7,000 and 10,000 megawatt-days per metric ton. The fuel to be supplied for the inventory, includ-

ing the reactor loading and material being fabricated, cooled, and processed, will contain about 1,300 kilograms of U–235. The burnup of U–235 in such a reactor operated at 80 percent load factor will be about 150 kilograms a year. For the entire 1-million-kilowatt program, the total inventory will contain about 9,000 kilograms of U–235 and the burnup will be about 1,000 kilograms of U–235 a year. For 20 years of operation a total of 29,000 kilograms of contained U–235 will need to be supplied for inventory and burnup. If 1,000 kilograms are added for research and test reactors associated with the program, this figure becomes 30,000 kilograms.

WORKING PAPER III

Estimated Conventional and Nuclear Power Costs in Euratom Countries

In the following tables, conventional power costs have been estimated on the basis of a level of prices for coal and fuel oil imported by Euratom countries that can be normally expected.[1] Nuclear-power costs have been estimated for 1963, when the reactors in the 1-million-kilowatt United States-Euratom program are expected to go into operation. The fuel-cycle cost for these reactors is expected to decrease as time goes on.

Various cases have been considered in order to cover the range of present possibilities in Europe.

Cases A and B are for new, conventional powerplants. Case A is for imported coal, and case B for imported fuel oil.

Cases C, D, and E are for nuclear powerplants of the pressurized-water type having construction costs per electrical kilowatt of $300, $250, and $350, respectively. It has been assumed that one-half of the construction cost is financed in Europe at an interest rate of 8 percent per annum, and for purposes of calculation it has been assumed that one-half is covered by a United States Government loan at an interest rate of 4 percent per annum, so that the average is 6 percent. Interest during construction is taken at the 8 percent rate (amounting to a total of 16 percent over the construction period).

For cases A through E, an amortization period of 15 years is assumed.

Cases F and G are for conventional and nuclear powerplants, respectively, and assume Government financing at an interest rate 4.75 percent per annum and amortization over a period of 30 years.

Calculation of fixed charges

		A	B	C	D	E	F	G
		Coal	Fuel oil	Nuclear	Nuclear	Nuclear	Coal	Nuclear
Basic assumptions:								
Net electric power	Megawatts	150	150	150	150	150	150	150
Construction cost	Dollar per kilowatt (electric).	135	110	300	250	350	145	300
Interest rate	Percent per year	8	8	6	6	6	4.75	4.75
Interest during construction.	Total, percent	16	16	16	16	16	9.5	9.5
Amortization period	Years	15	15	15	15	15	30	30
Amortization rate [1]	Percent per year	11.7	11.7	10.3	10.3	10.3	6.3	6.3
Taxes and insurance	Percent per year	2	2	3	3	3		1
Load factor	Percent	80	80	80	80	80	80	80
Calculations:								
Plant investment [2]	Dollar per kilowatt (electric).	160	125	348	290	405	160	328
Total fixed charges	Percent per year	13.7	13.7	13.3	13.3	13.3	6.3	7.3
Total fixed charges	Mills per kilowatt-hour.	3.1	2.5	6.6	5.5	7.7	1.5	3.4

[1] Equal annual payments to cover principal and interest.
[2] Construction cost plus interest during construction.

[1] It is to be noted that, due to current freight rates, these prices are presently lower.

ESTIMATION OF FUEL COSTS

Conventional fuels [1]

Conventional fuel	Energy content (kilocalories per kilogram)	Dollars per metric ton	Mills per kilowatt-hour [2]
Imported coal	6,800	18.50	6.8
Fuel oil	9,700	24.50	6.3

[1] It is to be noted that, due to current freight rates, these prices are presently lower.
[2] Assumes 2,500 kilocalories per kilowatt-hour.

NUCLEAR FUEL

Assumptions

1. Type of nuclear powerplant taken into consideration: PWR or BWR 150-electrical megawatt using uranium with an enrichment lower or equal to 3 percent, similar to powerplants already constructed or in the course of construction in the United States of America. The following calculations are based on the case of a PWR.

2. The inventory costs have been computed on the basis of a 4 percent interest rate on the initial value of the enriched uranium supplied for the inventory, assumed to be one full loading of the reactor plus one and a half times the annual throughput, in order to take into account fuel elements in storage, in the course of transportation, cooling, or reprocessing.

3. An average guaranteed irradiation level of 10,000 megawatt-days per metric ton of uranium and a fabrication price of $100 per kilogram (stainless steel cladding) have been considered for the fuel elements. This price includes all costs starting with uranium hexafluoride furnished by the United States AEC to the manufacturer up to the finished element, packed f. o. b. fabrication plant, thus including previous transportation, all manufacturing and supplies, namely cladding metals, and all other expenses. The price does not include the United States AEC charge for enriched uranium.

4. Processing and conversion charges for irradiated fuel have been based on the following papers:

"AEC Offers Processing Service to Owners of Private Reactors"
No. 983 of February 18, 1957
"AEC Notice Outlines Basis for Chemical Processing Contracts"
No. 999 of March 7, 1957
"AEC Specifies Conversion Charges Relating to Chemical Processing Service"
No. A–47 of March 12, 1958

5. The enriched-uranium purchase price was computed on the basis of document "Schedule of Charges", published by the United States AEC on November 18, 1956.

6. Plutonium has been credited at the United States published fuel value of $12 per gram of metal less the United States published charge of $1.50 per gram for converting plutonium nitrate to plutonium metal, including losses. Under these conditions, the fuel cycle costs in mills per kilowatt-hour are:

	Mills per kilowatt-hour
Fuel inventory	0.6
U–235 burnup	2.3
Fabrication	1.5
Chemical processing	.3
Conversion of UNH to UF_6	.1
Transport and insurance	.3
Plutonium credit	−.9
Total mill per kilowatt-hour	4.2

It should be noted that these costs are necessarily approximate and should be reviewed in detail for each particular project and even for each new core loading. However, it is the opinion of the Joint United States-Euratom Working Party that, on the basis of the stated assumptions, the calculations provide reasonable estimates of the initial fuel-cycle costs under this program.

Total costs of power in mills per kilowatt-hour

	A	B	C	D	E	F	G
	Coal	Fuel oil	Nuclear	Nuclear	Nuclear	Coal	Nuclear
Fixed charges	3.1	2.5	6.6	5.5	7.7	1.5	3.4
Fuel-cycle costs	6.8	6.3	4.2	4.2	4.2	6.8	4.2
Operation and maintenance	1.0	1.0	2.0	2.0	2.0	1.0	2.0
Total	10.9	9.8	12.8	11.7	13.9	9.3	9.6

WORKING PAPER IV

Fuel Cycle

A. OBJECTIVE

The objective of the fuel cycle program is that arrangements for supplying fuel elements for the million-kilowatt cooperative program will meet either criterion (1) or (2) below:

(1) The integrity of the stainless steel or zirconium clad fuel elements for light-water cooled and moderated reactors is guaranteed to an average irradiation level [1] of 10,000 megawatt-days per metric ton of contained uranium; [2] and the charge [3] for fabrication of fuel elements starting with uranium hexafluoride is—

(*a*) $100 per kilogram of contained uranium for fuel elements made of uranium dioxide having a U–235 isotopic concentration no greater than 3 percent by weight, diameter between 0.25 and 0.50 inch, and stainless steel cladding; or

(*b*) $140 per kilogram of contained uranium for similar fuel elements clad with zirconium cladding; or

(*c*) appropriately adjusted charges for fuel elements having different claddings or falling outside of the limitations on size, shape, or U–235 concentration.

Note.—For each type of fuel element, there will be computed as muturaly agreed, "computed fuel cycle costs" based on guaranteed average irradiation levels and fabrication charges, and taking into account all charges for fuel fabrication, inventory, burnup, chemical reprocessing, and transportation and the credit for plutonium. If the fabrication level and fabrication charge used is this computation are those given in A (1), the computed fuel cycle cost is defined as the "standard fuel cycle cost".

(2) The irradiation level in the integrity guarantee and the fabrication charge for fuel elements differ from the values specified in (1), but the combination gives a computed fuel-cycle cost equal to or less than the standard fuel-cycle cost.

B. GUARANTEES

1. Arrangements for supplying fuel elements that meet criterion (1) or (2) may be received from commercial sources but, in the event of failure of fuel elements, such arrangements may not sufficiently cover the extra costs of reprocessing and transporting irradiated fuel elements to meet the standard fuel-cycle cost. Under such conditions, the United States Commission will, for the purposes of prorating the chemical processing and/or transportation costs, offer to guarantee an average irradiation level, which, in combination with the guarantees offered by the manufacturer, would result in a computed fuel-cycle cost equal to the standard fuel-cycle cost. When such guaranties are made, if the average irradiation level actually attained is greater than the irradiation level guaranteed by the United States Commission, one-half of the resulting savings in costs of reprocessing and/or transporting irradiated fuel will be credited to the United States Commission, up to the sum of previous payments by the United States under this guarantee for the particular reactor concerned.

[1] Average irradiation level will be based on a weight of fuel equivalent to the nominal fuel loading of the reactor.

[2] Adjustments of the integrity guarantee may be required if cladding materials other than stainless steel or zirconium are used.

[3] Fabrication charges will be subject to escalation on the basis of a mutually determined index.

2. In the event that acceptable arrangements for supplying fuel elements meeting the criteria of A above are not received from commercial sources, the United States Commission will guarantee the fuel elements supplied under the following arrangements:

(*a*) If the fabrication charge guaranteed by the manufacturer is equal to or less than the value specified in A (1) above, the United States Commission will guarantee an average irradiation level which, when combined with this fabrication charge, will give a computed fuel-cycle cost equal to the standard fuel-cycle cost.

(*b*) If the average irradiation level guaranteed by the manufacturer is equal to or greater than the value specified in A (1) above, the United States Commission will guarantee a fabrication charge which, when combined with the average irradiation level in the manufacturer's integrity guarantee, will give a computed fuel-cycle cost equal to the standard fuel-cycle cost.

(*c*) If the average irradiation level is less and the fabrication charge is greater in the manufacturer's guarantee than in A (1) above, the United States Commission will offer to guarantee the values in A (1).

In cases (*b*) and (*c*) above, when the average irradiation level attained exceeds that guaranteed by the United States Commission, one-half of the resulting savings in fabrication costs will be credited to the United States Commission, up to the cost of payments by the United States Commission for fabrication charges for the particular core concerned.

If the average irradiation level does not meet that guaranteed in (*a*), (*b*), or (*c*) above, the United States Commission will adjust the charges for fabrication, chemical reprocessing, and transportation to the level that would have been incurred had that guarantee been met.

3. Fuel-element guarantees may also be developed for proven types of reactors other than light-water cooled and moderated, determined by the Euratom Commission and the United States Commission to be eligible for consideration under the joint program.

4. The guarantees provided by the United States Commission under paragraphs 1, 2, or 3 of this section will be applicable to all loadings made in the reactor during ten years of operation or prior to December 31, 1973, whichever is earlier.

5. In determining whether a guaranteed average irradiation level has been attained, account will be taken not only of all material discharged because of actual failure of integrity, but also material whose discharge, in the joint opinion of the Euratom Commission, the United States Commission, and the fabricator involved, was required for purposes of safe operation or economic operation (assuming for the latter determination that no guarantees were in force).

6. The technical and economic criteria under which proposals will be evaluated for acceptance will include minimum standards for fabrication charge and integrity guarantee for fuel elements. These criteria will also provide, as may be agreed, that subsequent reactor cores can be furnished by other than the initial fabricators.

7. In order to qualify for the guarantees by the United States Commission provided in paragraphs 1, 2, and 3 of this section, fuel elements must be fabricated by a United States manufacturer or by a manufacturer in Euratom countries under agreement with a United States firm or firms. However, reactors under the joint program may be fueled with elements from other sources. In such cases, the United States Commission will offer to perform chemical reprocessing services at its published charges with respect to any source or special nuclear material obtained from the United States. If adequate facilities are not available in Euratom when needed, the United States Commission will give sympathetic consideration to furnishing reprocessing services on material not furnished by the United States Commission.

8. The United States Commission guarantees will, in general, be extended to the utility through the fabricator of the fuel. In the event that it is determined by the United States Commission that the fabricator is not meeting adequate performance standards, or, if it is mutually determined that a more advantageous source is available, other contractual arrangements will be made for supplying fuel elements under the guarantee.

WORKING PAPER V

Chemical Processing

It is recognized that early Euratom programs for installation of nuclear-power stations may not produce a sufficient load of irradiated fuel elements to justify economically the construction of a new chemical processing plant in Europe. Thus, there may be an economic advantage in waiting until the power reactor capacity has reached several million kilowatts before building such a plant.

In view of this economic factor, the United States is prepared to undertake the processing of the irradiated fuel from the reactors constructed under the 1 million kilowatt cooperative program until such time as a suitable processing plant is constructed in Europe. The charges for processing this fuel would be the same as the established United States domestic charges. The bases for these charges are given in the attached announcements which were made by the United States Atomic Energy Commission: No. 983, issued February 18, 1957, titled "AEC Offers Processing Service to Owners of Private Reactors"; No. 999, issued March 7, 1957, titled, "AEC Notice Outlines Basis for Chemical Processing Contracts"; and No. A–47, issued March 12, 1958, titled, "AEC Specifies Conversion Charges Relating to Chemical Processing Service."

In addition, the United States Atomic Energy Commission will be prepared to provide technical advice and assistance, as desired, in the design and construction of the Eurochemic pilot plant and in the design and construction of any future large-scale chemical processing plant that the European Atomic Energy Community decides to construct.

It is anticipated that the Community while making full use of training possibilities in Europe also may desire to send technical personnel to the United States for training in chemical processing operations in preparation for the design and operation of a large-scale Euratom plant.

Attachment 1

United States Atomic Energy Commission,
Washington 25, D. C., Monday, February 18, 1957.

No. 983

AEC Offers Processing Service to Owners of Private Reactors

Pending the setting up of commercial services to do the work, the Atomic Energy Commission has established a policy to provide for chemical-processing services for the operators of private nuclear reactors.

The Commission offers to contract with the reactor owners providing for the chemical processing and recovery of source and special nuclear material contained in irradiated fuel elements removed from the reactors.

Individually negotiated contracts wil.l establish firm charges for the service, subject to escalation on the basis of an appropriate price index, and cancellation by the Commission, after giving 12 months' notice, upon a determination that the services will be commercially available at reasonable prices.

The purpose of the new policy is to give further encouragement to the development of a private atomic energy industry by giving licensed reactor operators an assured means for recovering the valuable constituents which remain in spent fuel elements after their removal from reactors.

The Commission service covers waste disposal in addition to processing of irradiated fuel elements and blanket materials.

Irradiated fuel elements are "spent" elements removed from a reactor. Substantial quantities of fissionable materials are still present in the elements and these can be recovered for reuse. The term "Blanket materials" refers to fertile materials which may be placed around the reactor core to be transmuted into fissionable material. After irradiation, the blanket is taken from the reactor and subjected to processing to remove the fissionable materials produced through the action of neutrons.

So far, operations of this sort are being performed only by Government-owned plants at various Atomic Energy Commission sites.

The Commission announced last year that it had approved a program to encourage private industry to build and operate plants for the chemical processing of irradiated fuel elements from research and power reactors. Under this program various meetings and seminars have been held for the information of industry, and the Commission has made available to interested firms its technology in the field of chemical processing. This program will be continued.

It is recognized, however, that several years will elapse before commercial processing plants can be put in operation, and that meanwhile reactor owners must have assurance that the service will be available when needed. The Commission, therefore, is offering its services during the interim. It is prepared to contract to provide these services with owners of licensed reactors for a term extending to June 30, 1967.

The Commission intends to furnish processing services at similar charges to reactors located abroad fueled with material supplied by the United States.

The term and cancellation provisions are set up in the expectation that in the next few years commercially operated processing plants capable of serving the private atomic energy industry will come into being.

Further detail is expected to be issued shortly in the Federal Register.

Attachment 2

UNITED STATES ATOMIC ENERGY COMMISSION,
Washington 25, D. C., Thursday, March 7, 1957.

No. 999

AEC NOTICE OUTLINES BASIS FOR CHEMICAL PROCESSING CONTRACTS

The Atomic Energy Commission has established the conditions under which it is prepared to contract with operators of private nuclear reactors to provide for chemical processing by the Commission of spent fuel elements taken from their reactors.

On February 18, 1957, the Commission announced that, until commercial facilities had been set up to do the work, it had approved a policy of establishing prices, under individually negotiated contracts, for the recovery of source and special nuclear materials contained in irradiated fuel elements or blanket materials removed from privately operated reactors. ("Blanket materials" are fertile materials placed around a reactor core to be transmuted into fissionable materials.)

While no demand for the immediate furnishing of processing services from private reactor operators is expected, the terms and conditions under which the services will be available have been established for the use of those planning power reactor projects. Details are provided in a notice to be published in the Federal Register on March 8, 1957.

Processing costs per kilowatt hour for individual reactor operators will vary, depending on such factors as the efficiency with which reactor heat is converted to electricity, the type of fuel element, and the attainable service life or "burnup" of the element. (A low burnup means that the reactor must be shut down and the fuel element removed for reprocessing more often than under conditions of high burnup.)

Principal features of the Commission notice are:

1. Contracts with private reactor operators extending through June 30, 1967, will be negotiated on the basis of operating a conceptual plant, capable of processing all the fuel element types now known to be planned for use in power reactors, at a standard daily processing charge of $15,300. Adjustments may be necessary for other types of fuel elements for which costs are substantially higher or lower, or which require modifications of the assumed plant. (The daily rate is based on costs associated with an assumed plant costing $20,570,000 to construct and with annual operating costs, including amortization, totaling $4,592,000. It is assumed that the plant would be capable of handling daily 1 ton of natural or slightly enriched uranium, and would operate 300 days annually).

2. Each contract will provide for firm charges for the service, except that they will be subject to escalation on the basis of an appropriate recognized price index to adjust for changes in costs of labor and materials.

3. Contracts will be subject to cancellation by the Commission, on 12 months' notice, if the Commission finds that fuel element processing services are available commercially at reasonable prices.

4. The services will provide for the mechanical, metallurgical and chemical treatment of spent fuel elements and blanket materials and storage of resulting wastes.

5. The processing system would yield purified nitrate salts of uranium and plutonium. There will be additional charges (not yet established) for conversion of these products to forms—uranium hexafluoride and plutonium metal—for which Commission prices have been established. There will be an additional standard charge to cover process losses, and unless waived by the Commission, a use charge for the materials during the normal processing time.

Attachment 3

UNITED STATES ATOMIC ENERGY COMMISSION,
Washington 25, D. C., Wednesday, March 12, 1958.

No. A–47

AEC SPECIFIES CONVERSION CHARGES RELATING TO CHEMICAL PROCESSING SERVICE

In connection with the chemical processing service available from the Atomic Energy Commission to operators of private nuclear reactors, the Commission has specified charges for converting the material resulting from the processing system into forms for which Commission prices have been established.

Last year the Commission announced that, until commercial facilities have been set up to do the work at reasonable prices, it will furnish a processing service for the recovery of source and special nuclear materials contained in irradiated fuel elements or blanket materials removed from privately operated reactors. The Commission will carry out the processing at firm charges under individually negotiated contracts.

The earlier announcement pointed out that the processing system would yield purified nitrate salts of uranium and plutonium, and that there would be additional charges, to be specified later, for conversion of these products to forms—uranium hexafluoride and plutonium metal—for which Commission prices have been established. These additional charges have now been specified, as follows:

1. Conversion of purified low-enrichment uranyl nitrate (5 percent or less by weight of U–235 in total uranium) into uranium hexafluoride (UF_6): $5.60 per kilogram of contained uranium.

2. Conversion of purified high-enriched uranyl nitrate (more than 5 percent by weight of U–235 in total uranium) into uranium hexafluoride (UF_6): $32 per kilogram of contained uranium.

3. Conversion of purified plutonium nitrate into plutonium metal: $1.50 per gram of contained plutonium.

NOTE.—Established prices for uranium hexafluoride vary according to the degree of enrichment in the isotope U–235, from $5.62 per gram of U–235 content for material of very slight enrichment to $17.11 per gram for material enriched to 95 percent in U–235.

For the period through June 30, 1962, established plutonium metal prices range from $30 to $45 per gram depending on the plutonium 240 content of the material. For the year July 1, 1962, through June 30, 1963, the established single price is $30 per gram.[1]

WORKING PAPER VI

THIRD-PARTY LIABILITY

The crux of the third-party-liability problem is upon whom, and in what proportions, should fall the risk of legal liability to persons who may be harmed as a result of nuclear incidents. How much, if any, of this risk is to be borne by (1) the supplier or operator in the particular nuclear incident; or (2) those in-

[1] The proposed joint program is based on the willingness of the United States to purchase plutonium, produced in reactors fueled with United States material, at the fuel-value price in effect at the time of such purchase.

dividuals who have sustained the harm; or (3) governments, through the disbursement of public funds to the harmed individuals.

There are, of course, any number of possible combinations for apportioning the risk. Under recently enacted United States legislation, as outlined more fully in the attached statement on the problem of the American supplier, the risk of liability for a nuclear incident is borne by the person liable, whether he be supplier or operator, up to the amount of liability insurance prescribed; the risk is borne by the United States Government as to liability up to $500,000,000 above that amount, the risk beyond the insurance prescribed and the $500,000,000 is borne by the persons harmed.

A number of other approaches could be considered. One approach, for example, would make the reactor operator solely liable, excluding all others (including suppliers) from any liability whatever, and limiting the operators, liability to a defined amount. Another would leave the supplier liable under applicable law, but would limit his liability to the amount of available insurance coverage. Under either of these approaches, the persons harmed would not be assured of recovery above the limit of liability fixed for the person liable.

Any approach which would limit or preclude liability of operators or suppliers requires action on a governmental level. This could take the form of national legislation or an international convention. In either case, while the person liable could be protected by this legislation against uninsurable liability in suits brought by persons harmed in the country or countries in which the legislation or convention was in force, it may be that he would *not* be protected against liability to persons whose injury or damage occurs in some other country. There may be other situations too, in which he would not be protected.

At this juncture, of course, it is not known what form the legislation in the various countries—or perhaps an international convention—may take; the extent to which it will protect suppliers and enterprises against liability beyond the coverage of insurance they can get; or how long it will take to get the legislation enacted or the convention ratified. For the interim period, until such legislation or convention becomes effective, adequate protection would require an indemnification guarantee from the community or the nation or nations concerned with the reactor or reactors. Beyond the interim period, adequate protection would appear to require such an indemnification guarantee against liability which might be adjudged despite the national legislation or convention.

Both parties recognize that adequate arrangements to protect equipment manufacturers and other suppliers, as well as the participating utilities, against uninsurable risk are necessary to implementation of the joint program. As can be seen, there are both immediate and longer-term problems of importance which require solution. A combination of means may be necessary to assure protection against risks which to a significant extent may be uninsurable. Accordingly, the Commission of the European Atomic Energy Community will seek to develop and to secure the adoption, by the earliest practicable date, of measures which will provide such protection. The parties will consult currently on the problems involved and on steps appropriate to their solution.

THE PROBLEM OF THE AMERICAN SUPPLIER

Under the so-called Price-Anderson law, enacted in 1957, the United States distributed the risk of third party liability as follows:

1. Risk is left where it falls under American law, up to the amount of "financial protection," that the Atomic Energy Commission requires to be provided. The financial protection required is to be based on the amount of liability insurance available from private sources, although the Atomic Energy Commission may establish lesser amounts for power reactors of no more than 100,000-kilowatt rated capacity. Operators of reactors are required to carry the amount of financial protection established by AEC. This will normally be in the form of insurance, and will also protect the suppliers and manufacturers to the extent they, rather than the operator, may be liable.
2. With respect to the risk *over* the required amount of financial protection:
   (*a*) The risk is eliminated entirely from the operator, and from the suppliers and manufacturers, by provision for a Government indemnification agreement with the operator, coverage of which extended to all persons who might be liable under American law.
   (*b*) The risk of harm over $500,000,000 plus the amount of insurance for each reactor incident is placed upon the individuals who might be harmed, by virtue of a provision limiting the liability of the person or persons liable to a total of $500,000,000 plus the amount of insurance.

(c) The risk of harm up to $500,000,000 is placed upon the United States Government, by virtue of the Government indemnification agreement referred to in (a).

Under the United States law, the foregoing applies only to domestic nuclear incidents. Foreign as well as American suppliers are protected by the indemnification agreements.

The American approach has had two purposes: first, to provide protection to the industry, beyond insurable risks, against conceivably enormous liability and, second, to provide the public (primarily, the American public) with assurance, to a considerable measure, of recovery of damages for injury or loss due to a nuclear incident.

The United States Congress did not extend the Price-Anderson protection to American suppliers for foreign reactors, although this matter was brought to its attention. For that reason the American supplier must look to the law of the country to which he is furnishing equipment or services, or to other measures, for his protection.

He has no protection at this time beyond the amount of insurance he is able to obtain. He is very concerned about this lack of protection. The nature of the risk is such that in the event of a major catastrophe he could conceivably be wiped out if liability should fall on him. Though this contingency may be remote for a number of reasons, it is conceivable. In negotiations thus far with American suppliers on larger reactors, the third-party liability question has been a serious problem. Thus far the only clear solution seems to be an indemnity agreement furnished to the supplier by the foreign government involved.

The problem is not peculiar, of course, to American suppliers. It is just as real to all who participate in constructing and operating in another country a reactor that could conceivably cause damage above the insurable risk.

WORKING PAPER VII

Financing of the Capital Costs

The construction of nuclear powerplants with an installed capacity of approximately 1 million kilowatts of electricity, is estimated to require a maximum total capital expenditure excluding fuel of about $350 per kilowatt or $350,000,000 (equivalent) in total, excluding interest during the construction period. (This compares with the cost of conventional power facilities of about $150 per kilowatt). Of the total amount of $350,000,000, it is estimated that $100,000,000 to $150,000,000 will be needed for equipment purchased in the U. S.

The general plan for financing the program is as follows:

1. Approximately $215,000,000 to be provided by the participating utilities and other European sources of capital; and
2. Up to $135,000,000 to be provided through a loan from the United States Government to Euratom for re-lending to enterprises.

The amount of $215,000,000 referred to above would come from sources within and possibly outside Euratom: from public utilities that will operate the plants, including funds from their own earnings, from banks and other sectors of the capital market; from the Governments of the member States of their agencies. Other sources of financing are also envisaged.

It is recognized that the prospects for obtaining capital from the various European sources cannot be defined in more than general terms at present; more detailed information will be provided as quickly as possible.

The proceeds of the loan from the United States Government to Euratom would be re-lent by Euratom for the construction of facilities under the program. The proceeds of the United States loan should be expended so as to assure the most efficient use of these funds in the joint program, taking into account the availability of other funds, their cost, and other factors relevant to this purpose.

It is not possible at this stage to specify the terms and conditions of the United States Government loan. A few general observations may be made, however. The loan should be for a long term, taking into account, among other relevant considerations, the expected life of the plants. The interest rate should be determined in the light of the purposes (in this connection it was noted that the United States loan to the High Authority of the European Coal and Steel Community was re-lent at the interest rate for the United States loan plus a small charge for administrative expense) of the program, allowing for re-lending by Euratom at rates appropriate to these purposes. It would be reasonable to have

a grace period for the repayment of principal which will take into account the period of construction of the facilities. Consideration will have to be given to the appropriate period of time during which the drawing of funds would take place.

The question of security for the United States loan has several aspects. On the one hand, it was pointed out that the unconditional commitment of repayment of principal and interest by the Community was buttressed by the unconditional obligation undertaken by the six member countries in the treaty, to provide the funds necessary to balance the budgets of the Community, including its investment budget. Since a loan to the Community from the United States constitutes a budgetary commitment approved by the Council of Ministers, the full faith and credit of the Community is supplemented by treaty obligations of the member countries to furnish the necessary resources in proportions specified in the treaty.

On the other hand, it was pointed out that the Community had no perennial resource other than that to be provided by member countries to support the budgets and no power to levy to secure such resources, and that the obligation of member countries ran to the Community but not to lenders to the Community.

There was also discussion whether or not an act of pledge similar to that entered into by the European Coal and Steel Community was necessary or appropriate in the light of the considerations mentioned in the two preceding paragraphs. The inconvenience of such a mechanism as well as other factors relating to it were also discussed.

It was generally considered that a commitment was appropriate that the obligation to repay the United States Government loan should not be placed in any junior or inferior position to the obligation to repay any other borrowings by the Community.

Another point discussed was the convertibility of the sums of principal and interest repayments to the Community on loans made by the Community to enterprises from the proceeds of the United States loan. It was pointed out that the treaty makes provision for such convertibility, which, when supplemented by appropriate financial regulations, will assure such convertibility. It will be necessary, of course, to examine such financial regulations.

It is clear that further consideration of these matters is necessary.

WORKING PAPER VIII

Note on Tariffs

The goods and products related to the joint program will be imported by the Community only after the Nuclear Common Market will have entered into force on January 1, 1959.

The area of application of the Nuclear Common Market is defined by three lists: A^1, A^2, and B. These lists may, at the request of the Commission or a member state, be modified by the Council acting on the proposal of the Commission.

List A^1 comprises in principle all materials under the competence of the Agency. For this reason they have been grouped in a special list. List A^2 comprises all goods and products which are specifically nuclear, i. e., which have practically no other application but in the nuclear field. List B contains the products which can be utilized either in the nuclear or in other industries.

Internal tariffs on items on Lists A^1 and A^2 will be abolished at the end of 1 year from the entry into force of the treaty. Similar action will be taken on List B items to the extent that they are covered by a common customs (external) tariff and are certified to be intended for nuclear purposes.

There will be a common customs tariff which will be established by a distinct procedure for each of the three lists as provided for by articles 94 and 95 of the Euratom Treaty.

As to the items on List A^1 there is no problem. For these items the common tariff will be laid down automatically at the level of the lowest tariff applied as of January 1, 1957, in any member state. Since at least one member state has no tariff on each item of List A^1, there will be no tariff on items on List A^1 on January 1, 1959.

The list most relevant to the joint program, however, is List A^2. There will be no automatically fixed tariff for this list. Article 94 provides that, within 3 months after the date of entry into force of the treaty, the Commission will open negotiations with the member states with regard to the products of List A^2. If,

at the end of the first year after the entry into force of the treaty, no agreement is reached, the Commission itself will make a proposal to the Council which shall, by a qualified majority vote, lay down the duties of the common customs tariff to be applied.

Also relevant to the joint program is List B. The rules concerning this list are laid down in article 95. There will be no negotiations for List B comparable to those provided for List A[2]. The principles and calculation methods of the treaty establishing the European Economic Community will be followed, i. e. the common tariff will be at the level of the arithmetical average of the member states' tariffs. However, according to article 95, the European Atomic Energy Community does not have to await the establishment of the Common Market before taking action with respect to the products of List B; the Council of Ministers may, by a unanimous vote, decide upon an earlier application of a common customs tariff.

The success of the joint nuclear-power program will be influenced by the extent to which cost of power can be minimized.

The cost of materials and equipment required for the projected facilities will be an important element in the cost of power. It will be in the interest of all concerned with the promotion of the program to eliminate all barriers to economical construction and operation and hence to have the lowest possible levels of duties on the items required therefor.

WORKING PAPER IX

Training, Information and Materials

A. TRAINING

The report "A Target for Euratom" recognized that some industrial reorientation would be basic to the success of the program and that an intensive training program would be essential to realize the proposed objectives. The report indicated that the United States would be prepared to assist the Community in training the required number of people. It also was recognized that the number of trained men required to design and build proven reactors, such as those contemplated under the proposed program, would be smaller than the number needed to develop entirely new facilities.

I. Basic objective

The overall objective of the European Atomic Energy Community's program is to develop a relatively self-sufficient nuclear-power industry in Western Europe and accordingly the Community will wish to become proficient in all major facets of the nuclear power industry, including reactor design and engineering, reactor operation, supervision and maintenance, chemical processing technology, fuel fabrication, waste disposal, and other fields that are essential to a well-integrated nuclear power industry. In addition, as the developmental and operational program of the Community progresses, the Community will have an ever increasing demand for persons with training in the fundamental physical and life sciences.

The basic purpose of the proposed joint program is the installation of a series of power reactors that will serve to provide the experience that the Community needs to move ahead on a large-scale basis. The training benefits to be derived will be an important result of the program.

II. Specific needs

(*a*) *Design engineering experience*

At the outset, it is to be expected that participating utilities and equipment manufacturers in the Community will be interested in obtaining detailed technical knowledge and engineering experience primarily on pressurized- and boiling-water reactors. In terms of relative urgency, accordingly, it is assumed that one of the most immediate requirements will be to provide this type of experience to a selected cadre of personnel from within the Community (including prospective reactor supervisors).

(*b*) *Training of station personnel*

Once the program gets underway, it will be necessary to evolve means of training power-station personnel in reactor supervision, operation, and maintenance. The magnitude of this training requirement is difficult to predict accurately. However, if one assumes that each of the reactor projects

under the proposed joint program will require of the order of 100 persons for plant operation, then a total of approximately 800 qualified people would be required for supervision, operation, and maintenance.

(c) Other requirements

In addition to the people associated with the design, construction and operation of the reactors themselves, it also is to be expected that the program will have other manpower requirements, in related fields.

Demands for training and on-the-job experience in the fields of fuel element fabrication, processing, waste disposal, etc., will arise in the near future.

The European Atomic Energy Commission itself is faced with the immediate problem of assembling and training its staff in the various technical fields in which it will have responsibilities.

III. How needs may be satisfied

To a large extent, it is expected that the Commission of the European Atomic Energy Community will go a long way in satisfying its own requirements for training in the physical and life sciences, and in basic reactor science and technology through its own resources. Chapter I of the treaty establishing the European Atomic Energy Community vests the Commission with the responsibility for establishing schools for the training of specialists, including the establishment of an institution at the university level. The United States Atomic Energy Commission will assist the Commission by making its facilities and experience available. It will work with the European Commission in the establishment of cooperative training programs.

It is expected, for example, that the United States Atomic Energy Commission will be able to assist the Commission of the European Atomic Energy Community in meeting part of its anticipated specialized training requirements in arranging for training in reactor design, engineering, operation, maintenance, supervision, etc., in selected United States facilities within the United States. It also is believed that arrangements can be made for the companies providing the nuclear components of the plants to be constructed to afford training in their plants to employees of the European utilities and manufacturers involved. In addition, the reactors constructed under the 1-million-kilowatt program in Euratom member states will constitute valuable facilities for the training of Community personnel. In addition, when feasible, the United States Atomic Energy Commission will make every effort to provide specialized training and experience in such fields as chemical processing, waste utilization, and fuel fabrication technology by means of temporary assignment of personnel to the Atomic Energy Commission laboratories engaged in this work (e. g. Oak Ridge, Argonne etc.).

B. INFORMATION

The United States Atomic Energy Commission and the Commission of the European Atomic Energy Community will engage in a full and prompt exchange of information in all fields related to the peaceful applications of atomic energy. This will be accomplished through an exchange of reports, symposia, the exchange of personnel and the establishment of mixed teams for joint projects. The United States will provide the Commission of the European Atomic Energy Community with an unclassified technical library and, if desired, will assist the European Commission in the establishment of a system for the distribution of technical information within the Community.

C. MATERIALS

Within the framework of the proposed program, the United States Atomic Energy Commission and the Commission of the European Atomic Energy Community will arrange to make available materials of interest in addition to those specified in Working Paper II, including source materials, special reactor materials, and materials under terms to be agreed. It is contemplated that persons under the jurisdiction of the United States and of the member states of the European Atomic Energy Community will be permitted, subject to appropriate regulations, to make arrangements to transfer and export materials and to perform services for persons under the jurisdiction of the other party.

D. OTHER ASSOCIATED FIELDS

At the request of the Commission of the European Atomic Energy Community the United States Atomic Energy Commission will be prepared to provide the

Commission of the European Atomic Energy Community with the experience it has had in the administration of a large-scale atomic energy program by providing information on the formulation of health and safety standards, health physics, monitoring for radiation protection, waste disposal, reactor hazards evaluation, regulations and licensing, contract administration and materials management.

WORKING PAPER X

Existing Projects

As stated in the memorandum of understanding, it is intended to give early consideration to projects which industrial groups have in an advanced state of planning. The nomination and selection of such projects as qualify would have a beneficial effect in imparting momentum to the program. Presumably, the initiative for proposing these projects for consideration will come from the industrial groups. It is important in discussions with the European utilities concerned, as well as their American associates, they be advised that should these projects become a part of the joint program, their projects would not only enjoy the benefits of the program but must assume the obligations as well.

It is also important for both Euratom and United States officials to make it clear from the outset that the incentives and guarantees of the joint program apply only to the projects selected and making up the 1-million-kilowatt objective and these benefits will not be available for other projects within the Community.

WORKING PAPER XI

Relationship of Proposed Joint Program to Existing Bilaterals

In the course of the discussions between representatives of the United States Government and the Commission of the European Atomic Energy Community in Paris in February it was agreed that it would be desirable if the United States and the Community eventually would enter into a comprehensive agreement for cooperation which would cover peaceful applications of atomic energy in all fields. Article 106 of the Community's treaty, as well as provisions in the existing agreements for cooperation between the United States and member states, contemplate a renegotiation of these existing bilateral agreements with a view to having the Community assume the rights and obligations now set forth in these agreements. It is expected that these negotiations with member states will take place in the context of the negotiation of the comprehensive agreement between the Community and the United States.

For the immediate future, however, it was agreed that it would be desirable to proceed at this time with a limited agreement between the Community and the United States which would be specifically oriented to the proposed joint program. The comprehensive agreement would follow as soon as the Community had arrived at appropriate understandings with the member states and had developed further its own plans and programs. The negotiation of a limited agreement initially at this time would assure that the Euratom program would not lose momentum pending the broader readjustments.

For the purpose of planning the proposed joint program it has been assumed that the amount of fuel required (approximately 30,000 kilograms of contained U-235) will be in addition to the quantities already contemplated in the existing agreements for cooperation between the United States and the individual member states of Euratom. The fuel for the reactors supported under the proposed joint program would be made available under the proposed initial agreement for cooperation between the Community and the United States. It is recognized, however, that under the joint program certain projects, in an advanced state of planning, may be selected for support and that in some instances these projects may be the same as the ones that were contemplated when the fuel ceilings were inserted in the individual agreements with the various member states. In such instances the reactors will be fueled pursuant to the initial agreement for cooperation with the Community but appropriate understandings will be arrived at with the member states.

The initial agreement will not modify the provisions of the existing agreements for cooperation with the various member states. These provisions will remain intact until they are renegotiated.

WORKING PAPER XII

Sale of Nuclear Fuel

The fuel inventory for a nuclear-power program consists of fuel in the reactors, fuel being prepared for insertion in the reactors, fuel being processed after discharge from the reactors, and fuel in storage or transit. It is estimated that the initial U–235 content of the fuel inventory supplied for the 1-million-kilowatt program will be approximately 9,000 kilograms in the steady state, but this will depend on the reactor designs, U–235 isotopic concentrations used, irradiation levels achieved, and other factors and will be determined jointly. By agreement between the United States and Euratom, adjustments will be made in the amount of material assigned to the fuel inventory to take account of changes in technology.

The United States will sell to Euratom the enriched uranium in that portion of the fuel inventory transferred to Euratom, at United States domestic prices in effect at the time of the transfer. Payment by Euratom on the principal may be deferred for a period not to extend beyond December 31, 1973, with interest to be paid by Euratom on this debt at a rate of 4 percent per annum. After the deferral period, Euratom will start paying in equal annual installments the debt incurred for the fuel inventory plus interest at 4 percent per annum on the unpaid balance. These payments will be completed during a period not to extend beyond December 31, 1983.

Enriched uranium transferred to Euratom above the amount of the agreed fuel inventory will be paid for by Euratom at the time of the transfer, at United States domestic prices in effect at that time. Uranium returned by Euratom to the United States will be paid for by the United States at the time of the return, at United States domestic prices in effect at that time.

Plutonium acquired by the United States from Euratom will be used only for peaceful purposes. To assure this, in any case where such material cannot, during its reprocessing, be kept separate from plutonium produced in the United States, an equal amount of United States plutonium will be reserved for peaceful uses. Plutonium purchased from Euratom by the United States will be paid for at the United States announced fuel-value price in effect at the time of the purchase.